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RECENT ADVANCEMENT IN THE STUDY OF BASAL METABOLISM IN HEALTH AND DISEASE*

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The voluminous literature on the subject of basal metabolism which has been published during the past decade is too extensive for a complete résumé to be made in an article of this kind. For any material published prior to 1924 the reader is referred to the excellent reviews by McCann (1), Talbot (2), and Boothby and Sandiford (3), and to the book by DuBois (4). The present communication will deal with the phases of energy metabolism which have been studied during the last five years. For the convenience of those who may not be familiar with the subject we will include a brief discussion on the fundamental principles.

I. ESSENTIAL PRINCIPLES

A. Definition. The term basal metabolism designates the postabsorptive heat production of an individual at complete muscular rest. He must be clad in comfortable clothing and be in an environmental temperature near 20°C.

B. Standard conditions. In order to secure true basal values it is essential that the test be taken after a fast of from 14 to 18 hours and a rest of at least thirty minutes immediately preceding the test. The above conditions have been adopted in most laboratories in order to eliminate all possibilities for error. However, a standardized small breakfast has been proved by several authors (5, 6) to have no influence on the basal metabolic rate provided the test is taken from 2 to 4 hours

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following the ingestion of the food. More recently, Bauer and Blunt (7) reported that a small breakfast of cereal, milk, bread, butter and fruit did not change the basal metabolism of children after an interval of 3½ or 4 hours. The calories varied from 200 to 470 and the protein from 3.0 to 13.8 grams.

Certain drugs as thyroxin and epinephrin have been proved to increase basal heat production while others, as iodine, decrease it. Therefore, it is wise to perform the test when the subject is free from the effects of any medication unless the metabolism is taken to determine the improvement following the administration of a drug.

Complete muscular repose is undoubtedly one of the most important requirements for making a metabolic test. A rest period of thirty minutes, according to Benedict and Crofts (8), has been proved to be sufficient to secure a minimum value. The mental attitude as evidenced by nervousness, anger, or fear may also elevate the heat production. Consequently, the second test is often found to be lower than the first and in certain neurotic cases a true basal value is obtained only after several preliminary tests. No less important than the above requirements is the environment. It is essential that the temperature of the room causes neither perspiration nor shivering. The increase of one degree centrigrade in body temperature will raise the basal metabolic rate approximately 7.2 per cent, according to DuBois (4).

C. Means of measurement. Many types of apparatus have been devised for measuring the heat production. However, only the underlying principles will be discussed in this communication. For details concerning the various types of apparatus the reader is referred to the treatises of Benedict (9), DuBois (4) and McCann (1). The various types of apparatus may be classified under the two headings, direct and indirect calorimetry. In the direct method the heat production is measured from the increase in the temperature of the water, circulating around an air tight chamber, in which the subject is placed. In the indirect method the energy value is calculated from the amount of either carbon dioxide eliminated or the oxygen consumed. The latter is the more reliable measure because the proportion of carbohydrate, protein and fat in the food has less influence on its consumption than on the carbon dioxide produced. Two types of apparatus have been devised to measure the heat production indirectly, the open and the closed circuit. In the former type the subject inhales outdoor air; the expired air is collected and analyzed for oxygen and carbon dioxide. In the latter type the subject breathes a measured amount of oxygen rich air and the

carbon dioxide of the expired air is removed by soda lime. The energy value is then calculated from the volume of oxygen consumed, which is represented by the difference between the original volume and that after the test. The result is generally expressed in calories per 24 hours or per square meter of body surface per hour. It is then compared with the normal standards of either Aub and DuBois (10), Harris and Benedict (11), or Dreyer (12). Benedict (13), in a recent article supplementing his earlier standards, pointed out that the basal metabolic rate for both men and women is lower than the former values. The difference is about 2 per cent for men and 5 per cent for women. This fact was also observed by Hafkesbring and Collett (14), and Wishart (15).

D. Related factors. In order to avoid the complicated technique required by any of the above types of apparatus, investigators have been searching for some simple factor which might be proportional to the basal metabolic rate. Insensible perspiration, or "perspiratio insensibilis" as designated by Sanctorius in 1614, is used to indicate the loss of body weight through the skin and respiratory tract. A possible relationship between basal metabolism and weight loss which might be applied clinically was first suggested by Meyer (16) and further elaborated by Benedict and Root (17). The latter demonstrated that the same factors, size, food and exercise, which play an important rôle in basal metabolism, also influence the insensible loss. Diabetic patients with a low metabolism had a diminished loss of weight, whereas hyperthyroid patients with a raised metabolism had a correspondingly increased insensible loss. In a study of a number of normal and pathological infants, Levine and his co-workers (18, 19, 20) found that approximately 25 per cent of the total heat production was lost by vaporization and 75 per cent by radiation and conduction. The basal metabolic rate calculated from the weight loss did not vary more than plus or minus 15 per cent from the Benedict-Talbot Standards.

The relationship between pulse rate, pulse pressure and basal metabolism has been observed by a number of investigators, but the subject is still in dispute. Smith (21) and Read (22) working with normal subjects, reported a considerable degree of correlation between the pulse rate and energy production. In the study of 126 cases of exophthalmic goiter and 71 cases of leukemia, Minot and Means (23) demonstrated an increase in pulse rate proportional to that of the heat production. According to Read (22), and Davies and Eason (24), observing 150 cases, the pulse pressure also varied with the basal metabolic rate.

An interesting study of urinary pigments by Drabkin (25, 26) revealed

the fact that when the pigment urochrome was augmented by disease or certain drugs, the energy value was also increased. By using an adequate synthetic diet, he further demonstrated that the coloring matter in the food had no bearing upon the quantity of the urinary pigment.

II. GOVERNING FACTORS

Many papers on the subject of normal metabolism which confirms the previous findings in fundamental principles have appeared within recent years. Aside from the influence of age, sex and size of the animal, the study has been extended to other factors such as race, climate and ultraviolet light.

A. Age. The basal metabolism expressed in terms of body weight or surface area is high in childhood because there is a larger proportion of active protoplasmic tissue. It decreases slightly up to the age of puberty and then it remains at a lower and comparatively constant level during middle life and declines gradually in old age.

In the premature or undersized infant the heat production is markedly lower than in the normal infant. Based on the observations of 21 cases, Marsh and Murlin (27) reported that the average energy value in the premature infant was 26.25 calories per square meter per hour, or 2.91 calories less than that of the normal, full term, or average sized infant. The value fluctuated during the first week of life, and it was usually lowest on the seventh day. From that time on it slowly rose until the time of expected birth when it approximated the values obtained from normal infants. They also noted that the respiratory quotient of the premature infant was very low, averaging for the first 5 days 0.74 and remained near this value until the 9th day.

According to the investigations from the same laboratory (28) the metabolism of normal newborn infants averaged 29.16 calories per square meter per hour. The heat production reached a peak at 48 hours of life; it fell gradually and uniformly to the sixth day; but it was always higher than that of the premature infant. At birth the normal infant had a high respiratory quotient which remained high until the stored glycogen was depleted, about the third day. Then it dropped to 0.73 and increased gradually to 0.85 at the end of the first week. The authors claimed that the nutritional condition of the child could roughly be determined by the value of the respiratory quotient. Talbot (29), working on normal children between the periods of infancy and puberty, stated that the greatest heat production calculated as calories per kilo of body weight occurred near one year of age. It corresponded to the

increased coördination and muscular tone as well as to the protoplastic tissue. A greater variation in the metabolic rate of infants than in adults was observed by Levine (30). The values ranged from minus 19 to plus 18 per cent of the accepted standards. It is difficult to obtain true basal values on infants owing to the impossibility of securing absolute quietness without food. According to Talbot (29), food increased the metabolic rate in infants from 8 to 15 per cent while Murlin and his associates (27, 28) reported a maximum rise of 12 per cent following the ingestion of 10 per cent lactose. The average elevation resulting from all the foods tested was 7 per cent. The same authors also pointed out that the crying of infants, 1 per cent of the time during which the test was made, raised the energy value 1 per cent.

Little work has been reported on preschool children since 1924. Recently Sandiford and Harrington (31) gave an abstract of their study of children between the ages of 5 and 17, stating that the decrease in calories per square meter of body surface progressed regularly with the ages, forming apparently a straight line in both sexes. Their findings agreed more closely with those reported by Benedict and Talbot than with those by DuBois. In our laboratory (32) in connection with the work on undernourished children, the metabolism for a group of normals from 4 to 11 years of age averaged about 10 per cent higher than the standards given by Benedict and Talbot. Calculated on the basis of calories per kilo per 24 hours the average of 9 children was 41.3 calories. Klugh (33) and Cameron (34) in their studies of normal preadolescent children observed a slightly higher basal metabolism than the Benedict-Talbot standard. The study of MacLeod (35), on girls from 11 to 14 years of age, showed a greater basal heat production when computed in calories per square meter per hour, between the ages of 12 and 13 years, than that previously reported. Later this was confirmed by Blunt and her associates (36) in their study of 46 girls between the ages of 8 and 18. A maximum value of 41.3 and 42.4 calories per square meter per hour at the age of 12 years was reported respectively by the above authors. According to the authors last named, "From 9 to 13 years the total calories per 24 hours increased steadily from 1,084 to 1,437, the calories per kilo decrease equally regularly from 36.6 to 30.2, and the calories per square meter per hour from 43.4 to 41.0. The calories per cm. fluctuate around 8.1 to 9.2." They also demonstrated that "underweight girls tend to show a high basal metabolism if computed in terms of calories per kilo, a low or normal metabolism in terms of total calories or calories per square meter or per cm. For overweight girls the figures are re-

versed; the calories per kilo are low and the total calories and the calories per cm. high." More recently a similar investigation on girls from 14 to 18 years was published by McKay (37). Her results were in agreement with the above authors. Between the ages of 15 and 18 the heat production gradually decreased but it was at all times higher than the standards of Benedict. A considerable increase in basal metabolic rate during the age of puberty was found by Lax and Petenyi (38) in more than one-half of their 30 cases.

During adult life when all metabolic processes have been stabilized there is little change in the basal metabolic rate. Benedict and Finn (39) after experimenting for seventeen years on the same twenty subjects both before and after summer vacations, noted that with the exception of two cases, the vacation made no difference in the heat production. The constancy of basal metabolism was further demonstrated by Benedict (40) in a study made on himself and three collaborators over 12 to 19 consecutive years. No change was found until two of the subjects reached the ages of 42 and 47. At that time there was a slight decrease corresponding to diminished physical vigor. On the other hand, Lusk and DuBois (41) reported that the reduced metabolism of old age might be due to the lack of exercise and to indoor confinement. They also said that a man between the ages of 30 and 41 would show a variation in metabolism of no more than plus or minus 7.6 per cent during the 11 years. When Legrand (42) studied the basal metabolism of 12 men and 9 women between the ages of 62 and 82, he discovered a decided reduction in their values as compared with the standards for people between 30 to 50 years of age. He attributed this difference to the diminished influence of the thyroid gland on metabolism.

B. Sex and menstruation. It is generally known that, except during the period of infancy, the basal metabolism of men is higher than that of women of the same age and stature. In order to determine the contributing cause, many investigators have studied the influence of the sex glands on heat production. In the review of Boothby and Sandiford (3) they concluded that the majority of the authors failed to find any rhythmic variation in metabolism corresponding to the menstrual cycle. Lanz (43) expressed the same opinion concerning his normal subjects, but Hafkesbring and Collett (14), Hitchcock and Wardwell (44), Stephani (45), and Bornstein and Välker (46) all reported a cyclic variation with a depression during the menstrual period. The study of metabolism after castration should throw some light upon the subject but the results are very contradictory. The basal metabolic rate was lowered,

according to Liebesny (47) and Litzenberg (48), by sterility, disturbance or removal of the sex glands. Complete roentgen ray castration also reduced the values for the patients of Kraul and Halter (49) and Plaut and Timm (50). The diminution may be caused by the decreased stimulation of the thyroid gland (48, 50). After the removal of both ovaries in 31 of the 48 cases with active menstrual function before operation, Geist and Goldberger (51) observed a decrease in the basal metabolic rate of from 1 to 24 per cent. In 13 of the cases there was an increase of from 2 to 15 per cent and in 4 cases no change at all. Although the decrease in metabolism has often been associated with an increased weight, the above authors observed no definite relationship. King and Patterson (52), Castex and Schteingart (53), and Bugbee and Simmond (54), the latter working on dogs, failed to find that an endocrine insufficiency of the genital organs influenced the metabolism. The lowered energy value of the dogs was attributed to the lack of muscular exercise and psychic stimulation.

C. Race. The influence of race on basal metabolism has been studied recently by several investigators. MacLeod, Crofts and Benedict (55) found that the basal metabolism of 9 Oriental women students at Columbia University was approximately 10 per cent below standard. Their results were confirmed by Takahira and his collaborators (56) working at the Imperial Nutrition Institute of Japan. On the other hand, Okada, Sakurai and Kameda (57) in their study made on 42 Japanese men and 11 women, showed that the average deviation from the Harris-Benedict standard for men was minus 0.2 per cent, and for women minus 3.9 per cent. The corresponding values as compared with the DuBois standards were minus 2.0 per cent for men and minus 0.7 per cent for women. Hence, they concluded that there was no difference in the heat production of Oriental and Occidental people. During an archaeological expedition to Yucatan, Williams and Benedict (58) made a study of the metabolic rate on 32 male Mayas. The average results were 5.2 per cent above the standards. They attributed the difference to racial characteristics and thus upset the theory that a low heat production might indicate racial inferiority. The basal metabolism of both brown and black men and women was determined in Jamaica by Steggerda and Benedict (59). The average value of 37 brown male subjects was minus 5.4 per cent, being slightly below normal, and that of 5 women was minus 3.4 per cent. The corresponding value of 8 black males was minus 2.0 per cent as compared with the Harris-Benedict standards. Thus the results were within normal limits. In an intensive study on 90 Near Eastern subjects and 13

Americans in Syria, Turner (60) reported that the basal metabolic rate varied from minus 0.48 per cent in the American group to minus 5.9 and 6.5 per cent in the Near Eastern subjects. He believed that the difference was caused by racial factors including climate, dietary habits as well as their civilization.

D. Climate, temperature, ultra-violet light and altitude. The unexplained variation in the basal metabolic rate of individuals as well as the difference between various races suggests that the climate may possibly be one of the causes. However, the results obtained in tropical countries have been very contradictory, according to Sundstroem (61) in his review. Based on his own data (62), obtained in tropical Australia, and those of other investigators, he concluded that the metabolism of both white and black men in a warm climate was from 10 to 20 per cent below the standards for the temperate zone. He (63) also found a lowered metabolism in rats in an artificially produced tropical climate. Mukherjee (64) and Fleming (65) confirmed the above low results in their study of young men. The basal metabolic rates were 9 and 7 per cent, respectively, below the accepted standards. Even in New Orleans the subjects of Hafkesbring and Borgstrom (66) had an average heat production of 14, 16 and 18 per cent below the normal standards of either Dyer, Harris-Benedict or DuBois. The minimum value, they claimed, was reached seventeen hours after the last meal and it did not vary from day to day. Coro (67), experimenting on eighty women in Havana, noted no perceptible diminution of their metabolism; although Montora (68), working in the same laboratory, insisted that the low results which he had previously reported were correct. In an extensive comparison between Malays and Europeans in the Dutch East Indies, Eijkman (69) observed that there was no variation in heat production on account of either climate or race. A seasonal variation of the gas exchange in humans was shown by Griffith and his associates (70). From June to September their subjects consumed less oxygen and therefore their calories per square meter per hour were lowest. In the study of the effect of thermal environment on basal metabolism, Benedict and Benedict (71) determined the heat production of the same subject at 60°F. and again in a bath at 98°F. A slight increase was found at the latter temperature, due to the extra activity of the cells in an effort to bring the normal skin temperature to that of the water. McConnell and Yaglo-glow (72), confirming the above results, demonstrated an increase in the basal metabolic rate at temperatures above 83°F. and also below 70°F. It was pointed out by Morgulis (73) in his work with dogs that the in-

creased metabolism at a high temperature was due to restlessness and that at a low temperature it was due to shivering. In contradiction to the above authors, no change except a slight lowering in rare cases was reported by Delcourt-Bernard and Mayer (74).

Although inconclusive, much work has been reported on the influence of light on basal metabolism. Zakowenko (75), in a series of 40 experiments of 3 days each, conducted at the seaside, observed that the metabolic rate was increased by wind and diffused ultra-violet rays but was decreased by an excessive amount of heat rays from the sun. Harris (76) claimed that a group of rays between 436 and 291 millicrons increased the carbon dioxide 20 per cent. Pathologically high metabolic values were reduced by the heat from the electric cabinet of Schur and Low (77), but the energy value of normal subjects was not affected. Ultra-violet light caused a transitory rise in the heat production in the cases of Lippmann and Välker (78) and a lowering in 8 out of the 10 normal subjects studied by Mason and Mason (79). The decrease was most marked when the circulating bilirubin, which they claimed to be an index of the ultra-violet light absorbed, was elevated. In their other two subjects the basal metabolism was lowered by photoporphyrin, a radio active substance contained in buckwheat, which could increase the absorption of the ultra-violet light. In the studies of Eichelberger (80), Fries (81), Fries and Topper (82), and Campbell (83) using either carbon arc or mercury vapor lamps, only insignificant variations in the basal metabolic rate were reported. Kestner and his co-workers (84), in accordance with previous investigations, found that an altitude of 2400 meters did not change the heat production but that climate, irradiation and cold elevated it.

E. Mental and physical activity. The influence of mental activity on basal metabolism has been studied by a number of investigators. Ilzhöfer (85) noted a slight increase in caloric output, but he interpreted this increase to the slight muscular movements of the head and eye. Music, according to Landis (86), produced a lowered metabolic rate which was possibly due to the relaxation of the nerves. In the same article he reported that anger, fear and the anticipation of a strong electrical stimulation or the stimulation itself raised the heat production from 6 to 37 per cent. An elevation was also demonstrated by Pickworth (87) in his normal subjects who were reading, partially observing their surroundings, or feeling irritated. Segal, Bingswanger and Strouse (88) showed that the basal metabolism rose in a group of untreated hyperthyroid patients following the knowledge of an impending operation.

Negative results were obtained in normal groups and in those treated with iodine. However, Ziegler and Levine (89) obtained an increased basal metabolic rate in some of their psycho-neurotic patients without goiter, after an emotional stimulus. Deutsch (90) demonstrated that fright produced during hypnosis caused an increased heat production in all except one patient in whom there was a collapse and a lowered metabolism.

Wilson and his associates (91) reported a decrease in the energy value during sleep of 11.3 to 26.9 per cent. In a study made on 12 children, both when they were asleep and awake, Wang and Kern (92) found a marked decrease in heat production during sleep. The decrease varied between 5.7 and 31.6 per cent with an average of 15 per cent. Working with adults, Pickworth (87) confirmed the above results by showing an average decrease of 18.5 per cent in his subjects.

Basal metabolism taken following moderate exercise or physical training gave very slightly lowered values in the majority of cases according to Benedict and Crofts (8), Pickworth (87), and Schneider and his associates (93); Steinhaus (94), and Kunde and Nordlund (95) confirmed the results in dogs. On the contrary, Wishart (96) reported a slight increase between 1 and 2 per cent in the heat production following physical exercise, and a correspondingly lowered respiratory quotient. Pickworth (87) found no appreciable difference in the heat production after resting on a bed, or in an arm chair, or following a hot bath.

F. Diet. The specific dynamic action following the ingestion of protein foods has suggested that the basal heat production may vary with the protein of the diet. Based on the results of one case, Kleitman (97) intimated that the basal metabolic rate was proportional to the protein intake. His study was made on a subject following a fast of 41 days, but the food intake was not carefully controlled. During two of his high protein periods the diets contained either 4 pounds of meat or from 36 to 48 egg whites daily, and the caloric values varied widely. A close correlation between the basal heat production and the nitrogen excretion confirming his earlier work (96) was reported by Wishart (98). He went so far as to say that the daily variation in metabolism is largely due to the inconstant nitrogen of the diet, and also that it could be predicted wth considerable accuracy from the nitrogen excreted. The average value of heat production on a diet containing 30 grams of protein per day was 26.83 calories per square meter per hour, and the corresponding figure on a diet containing five times as much protein was 40.39 calories. In the subjects studied by Deuel and his associates (99), a change

from a protein free diet to one containing 225 grams daily brought about a maximum increase in the basal metabolic rate of 29 per cent during a period of 81 days. The investigators from New Orleans (100) reported a marked fluctuation in heat production following a high caloric diet as measured by the urinary nitrogen. Each change in food intake caused a drop in the metabolism which tended to return to the former value as the body became adjusted to the diet. In our laboratory (101) we have failed to find any noticeable difference in the basal heat production in a careful study of the influence of high and low protein diets on the metabolic changes in six normal adult women. The high protein diet contained 2 grams of protein per kilo of body weight, while the low protein diet contained only 0.6 gram. The caloric value of the two diets remained the same and the foods and excretions were carefully analyzed. An interval of two weeks was allowed between the diets, during which the protein was gradually reduced until it reached the low level and was then followed by a preliminary period of one week. No metabolic tests were made during either period. The discrepancy of our results may be due to the constant caloric value, to the small difference in the protein level of the two diets, or to the fact that equilibrium had been established before any tests were made. Asher and Honda (102) using rats which had been fed exclusively on bacon failed to find any influence of protein on the basal metabolic rate. Truszkowski (103) and Hicks (104) reported that the heat production was not influenced by the addition of purine containing foods to the diet.

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THE EFFECT OF LIVER ON THE BLOOD SUGAR IN DIABETIC PATIENTS*

HARRY BLOTNER, M.D.

A number of pernicious anemia patients that were treated with liver as suggested by Minot and Murphy (1) complained of marked hunger, headache, tremors and sweating. These symptoms simulate those associated with a low blood sugar resulting from an excessive dose of insulin. The blood sugar in certain of these cases was found to be below the usual normal level. This observation led to the study of the blood sugar level in diabetic patients following the intake of a definite amount of liver. A detailed report of this work was given in the *Journal of the American Medical Association* (2).

Liver has been generally forbidden in the diabetic diet because of its carbohydrate content. This fact is illustrated by a letter which I recently received from a physician which reads as follows: "I have just finished your article on 'The Effect of Liver on the Blood Sugar Level.' . . . . Aside from its scientific value, I am a mild diabetic of over twenty-five years duration. . . . . I really would like to try it out on myself clinically, particularly as I have abstained from liver almost religiously."

However, there have appeared in the French literature from 1896 to 1905 several publications concerning the effect of liver in diabetes mellitus by Gilbert and Carnot (3), Jousset (4), Lamoureaux (5), Gilbert and Lereboullet (6), Laumonier (7) and Lassance (8). The general opinion of these men was that liver therapy had a definite influence on the glycosuria in a number of diabetic patients, but that its effect varied according to the case. Sometimes the use of liver caused a diminution or disappearance of the sugar in the urine, while at other times it had no appreciable influence, or even increased the glycosuria. They felt that those cases of diabetes mellitus which were influenced favorably by this treatment were those associated with a decreased function of the liver, while the cases which did not improve or were even made worse by the

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treatment were those in which the sugar in the urine appeared to be dependent on an increased activity of the liver.

This paper presents a brief study on the effect of liver on the blood sugar in cases of diabetes mellitus.

PROCEDURE

In the experiments on diabetic patients, the blood sugar was determined in a morning fasting specimen of blood, and usually three, six and nine hours following the ingestion of a uniform test meal containing 20 grams of carbohydrate, 40 grams of protein and 35 grams of fat, the protein being largely supplied in the form of red muscle meat. This was known as the control test. On another day the blood sugar determinations were made at the same intervals, the test meal containing 180 grams of raw liver pulp, as prepared by Tubbs and Bellinger (9), with the total amount of carbohydrate, protein and fat being the same as in the control test meal. Calf's liver was used in each case. The following is a record of the food substances contained in the test meals:

Control test meal		*Liver test meal*	
Lean steak	160	Liver pulp	180
Orange juice	80	Orange juice	100
Uneeda biscuits	2	Uneeda biscuit	1
Cream—40 per cent	45	Butter	3
Coffee		Cream—40 per cent	60
		Coffee	

BLOOD SUGAR CURVES

In twelve diabetic patients, the blood sugar level nine hours after the control test meal varied from 16 mgm. above to 48 mgm. below the fasting blood sugar level; the average drop in the blood sugar during this period of time was 33 mgm.

Following the administration of the test meal containing liver to these diabetics, there was a marked fall in the blood sugar which varied from 16 to 122 mgm.; the average fall amounted to 81 mgm. below the fasting blood sugar level. An illustration of the blood sugar curves obtained in this group is shown in chart 1.

Hunger, headache of varying intensity and slight dizziness were outstanding complaints which all of the patients made six and nine hours after the liver test meal. These symptoms were not noticeable following the control test meal, and it is possible that they were due to a rapid lowering of the blood sugar.

RELATIVE EFFECTS OF INSULIN AND LIVER

A comparison was made of the relative effects of insulin and liver on the blood sugar in certain diabetic cases. The blood sugar determinations were made at similar time intervals as in the previous experiments. In the experiments with insulin, the desired dose was injected subcutaneously, following which the control test meal was given. The experiments were conducted within a few days of each other.

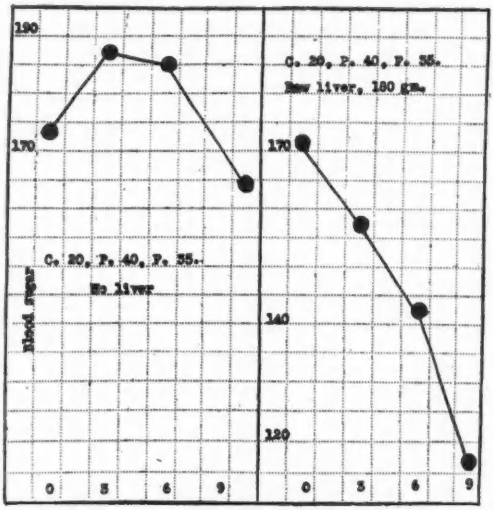

CHART 1. BLOOD SUGAR CURVES OBTAINED IN A DIABETIC PATIENT AFTER THE ADMINISTRATION OF THE TEST MEALS

In all the charts the blood sugar is recorded in milligrams per hundred cubic centimeters of blood. Excepting in chart 3, the time interval is recorded in hours.

In one case 13 units of insulin were injected and its effect compared with that of liver and a control test meal. The resulting blood sugar curves are shown in chart 2. The blood sugar level nine hours after the injection of insulin was lower than in the control test. The blood sugar curve following the liver test meal is also shown and demonstrates the fact that in this instance 180 grams of raw liver pulp apparently caused a greater drop in the blood sugar within nine hours than did 13 units of insulin.

Insulin, in doses of 5 and 10 units respectively, was injected in two other cases and its effect compared with that of liver as in the previous

case. In these cases 180 grams of raw liver pulp caused a greater decrease in the blood sugar at the end of nine hours than did 5 and 10 units of insulin.

CLINICAL USE OF LIVER

As the result of these experiments, it is reasonable to conclude that liver contains a blood sugar reducing substance. An attempt was made

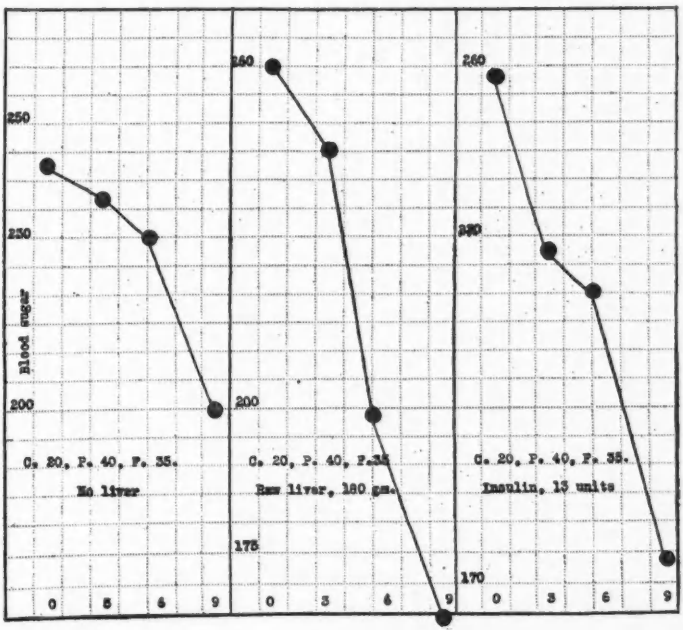

CHART 2. EFFECT OF INSULIN, 13 UNITS, AND OF LIVER IN A PATIENT WITH DIABETES

to determine whether or not this fact can be made of clinical value in the treatment of diabetes. To study this problem a group of six diabetic patients was given large doses of liver each day, or several times a week, over a varying interval of time.

These patients on admission to the hospital were maintained for a control period of time on a constant diet containing no liver. The fasting blood sugar was determined frequently. When it was felt that the blood sugar had reached a fairly constant level, 180 grams of raw liver pulp was included in the diet, the total amount of carbohydrate,

protein and fat, however, remaining the same as during the control period. The liver was given in two doses. The blood sugar curve obtained in one such case is shown in chart 3.

After liver was included in this case, the blood sugar decreased from 204 to 120 mgm. on the third day. Then, as the amount of liver was decreased, the blood sugar rose again.

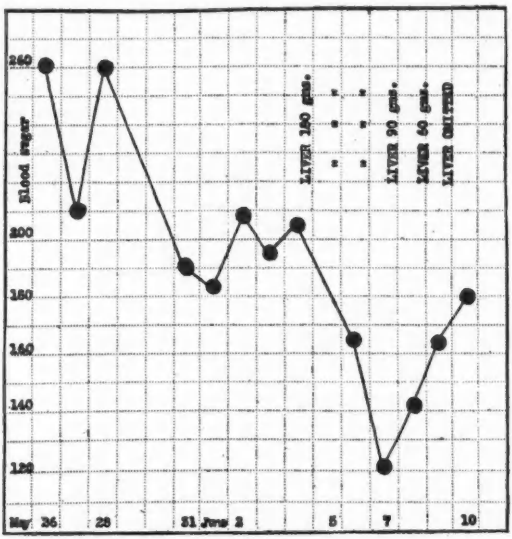

CHART 3. BLOOD SUGAR CURVE BEFORE AND AFTER LIVER DIET IN A PATIENT WITH DIABETES ON A DAILY DIET OF CARBOHYDRATE, 100 GRAMS; PROTEIN, 70 GRAMS; FAT, 130 GRAMS

Four other diabetic patients were observed in such a manner for approximately one year while another patient was followed for thirty days. The results were similar to those obtained in the previous case.

One of these patients was interesting in that one-half pound of liver, taken three or four times a week, replaced 10 units of insulin which was previously administered twice daily. The patient was unable to inject the insulin herself and, as a result, it had been necessary for her to pay $1.50 a day to a nurse for the injections. Liver not only replaced 20 units of insulin daily but also eliminated the cost of injections. As soon as the patient took liver she began to feel much better generally. This general improvement was especially noted by the family.

SUMMARY

Liver is now known to have a beneficial effect on the blood sugar of diabetic patients, whereas previously it was considered as an unsuitable article of food for these patients.

Four patients with diabetes, taking liver daily, or from three to five times a week, have been observed with repeated blood sugar determinations for approximately one year, while two were followed for twenty and thirty days. It was found that the blood sugar in these cases remained at a lower level than it did previous to liver treatment.

These observations suggest that liver contains a blood sugar reducing substance, active when taken by mouth, non-toxic, and with an effect on the blood sugar similar to that obtained with insulin.

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DIET IN DIABETES*

DOROTHY DEMAREST, M.S., AND MARTHA KOEHNE, PH.D.

The present century has brought many changes in methods of feeding diabetic patients. During this period two dates, 1914, when Allen introduced the undernutrition treatment, and 1922, when insulin was first used, stand out conspicuously as representing distinct advances.

Several interesting methods of dietary control had been introduced prior to 1914. Noteworthy among these were Mossé's (1902) potato cure, the first of the high carbohydrate-low protein and fat diets, later followed by von Noorden's oatmeal cure in 1903, varied often by the substitution of banana. From 200 to 250 grams of oatmeal were given as gruel every two hours, together with 200 to 300 grams of butter and often a few eggs. Otherwise nothing was allowed except "black coffee or tea, lemon juice, good old wine or a little brandy or whiskey." Many cases, after three or four oatmeal days, gave negative urinary sugars. In other cases the program was usually preceded by a few days of low carbohydrate-low caloric diet, the so-called vegetable days. When the oatmeal diet immediately followed a general mixed diet, improvement did not result as promptly. A typical oatmeal day provided approximately 160 grams carbohydrate, 40 grams protein, 216 grams fat and 30 cc. alcohol, with a K:AK ratio of 1.2:1 using the Ladd and Palmer (1923) method of calculation where K = 100 per cent of the fat in the diet and AK = 100 per cent of the carbohydrate plus 58 per cent of the protein. For a complete review of all these older types of diets, *see* Joslin (1923).

In 1914 Allen announced his first results with a method designed to keep diabetics constantly in a state of undernutrition (Allen, September, 1914, and October, 1915). Many variations in his original method were gradually adopted. A low carbohydrate-low protein-low fat diet was usually alternated with fast days, vegetable days, and sometimes egg days (two to three eggs only being allowed). Patients became sugar-free

* From the Department of Nutrition of the Presbyterian Hospital. These data are from the thesis submitted by Dorothy Demarest to the Faculty of Practical Arts, Columbia University, in partial fulfillment of the requirements for the degree of Master of Science. It is a privilege to acknowledge the service rendered by Dr. W. W. Palmer, who carefully read the manuscript during its preparation and made helpful suggestions for its improvement.

who were never sugar-free before; coma was far less frequent (unless of endogenous origin); hospital stays were shortened and the number of severe cases was materially reduced. The average length of life of a diabetic rose to four and one-half years. However, children did not thrive on this treatment, neither did the very fat diabetic or those with complications.

Commenting on the undernutrition treatment, Joslin stated in 1917 (*see* reference 1923):

> At the present time the patients certainly go home in better condition and with lower blood sugars than two years ago. Still the melancholy fact remains that the patients leave the hospital with 23 calories (per kilogram) instead of a permanent self-sustaining diet. A gain of 3 or 4 calories per kilogram would mean everything to diabetic patients. The shortage in calories is in great part due to the weekly "fasting" day or "half" day.

The milk diet first advocated by Donkin in 1874 and later by Williamson in 1915 probably owed its success to its restriction in calories with subsequent undernutrition.

Utilizing the general advantages of undernutrition, Newburgh and Marsh (1920, 1921, 1923) advocated their low carbohydrate-low protein-high fat diet for diabetics. They claimed that with diets providing 15 grams carbohydrate, 20 grams protein and 80 to 90 grams fat, ketosis did not develop, and if present would disappear in spite of K:AK ratios of over 4:1. They pointed out that it was no more harmful to furnish the diabetic with exogenous fat for consumption than to compel him to subsist upon his own body fat. Their most liberal diet provided only 30 to 40 grams of carbohydrate, 50 to 60 grams protein and enough fat to make 2000 to 2500 calories daily. Some physicians have met with success in using this diet and it is still advocated, with modification, by many. Others feel that such high fat diets are not desirable. Their reasons are to be given later.

Before insulin was discovered, Shaffer (July and November, 1921, 1922, 1923, 1924), Woodyatt (1916, 1921), Wilder and Winter (1922) and others had begun studies on the relation of ketosis and diabetic coma to variations in the proportion of fatty acids and glucose which the body cells were attempting to metabolize. Their researches resulted in a much clearer understanding of the inter-relationship in metabolism of carbohydrates, fats and proteins, whether of endogenous or exogenous origin.

Intarvin, a new fat preparation, was synthesized by Kahn (1923).

Its manufacturers hoped that it would be possible to give diabetics unlimited amounts of this fat without danger of ketosis. It was made from a synthetic margaric acid, containing an odd number of carbon atoms (17). Intarvin proved unpalatable and hence was difficult to incorporate in the diet, besides being very expensive. However, about the time it was placed on the market the rapid development of the use of insulin in diabetes and ketosis eliminated all necessity for its use.

The discovery of insulin (Banting, Campbell and Fletcher, 1922) has revolutionized the dietary control of diabetes. It had been largely due to diabetics that dietitians made their first entrance into the hospital field. Even today a large part of the time of many dietitians is spent on problems connected with the feeding and teaching of diabetic patients. Perhaps with further improvements in the administration of insulin, the time will come when this too may change. A diabetic diet may, except in early stages of treatment or in periods of emergency, be considered as merely a simple modification of a normal diet.

With this brief review of some of the methods advocated in the past for the dietary control of diabetes, the change that the use of insulin has brought about can be spectacularly realized through the study of a 9 year old girl who began her career as a hospital patient in the Presbyterian Hospital, New York, early in 1920, before the discovery of insulin. She was the second patient in New York to receive insulin. Through the courtesy of this hospital her record was available for study. She was a patient in the hospital four different times and her progress outside the hospital has been followed continuously in the clinic.

M. M. was born in this country and lived at home with her parents, brother, sister, and grandmother. Her maternal grandmother had been a diabetic since 1906. She was an ordinarily healthy child, fond of bread and potatoes, but was moderate in her use of sweets. Her meals were at regular times but were usually eaten hurriedly because of the desire to play. She had never been troubled with constipation, slept well and had ample out-door exercise.

In October, 1920, when 9 years old, she began to be troubled with insomnia, accompanied by loss of weight, polyuria, polydypsia, and polyphagia. The family physician made a diagnosis of diabetes mellitus. She was admitted to the hospital for the first time November 8, 1920, in an advanced state of coma. Her blood CO_2 carrying power was only 10.9 volumes per cent and her blood sugar 380 mgm. per 100 cc. She received the $NaHCO_3$ treatment customary for diabetic coma at that time and considering the seriousness of her condition, her recovery in

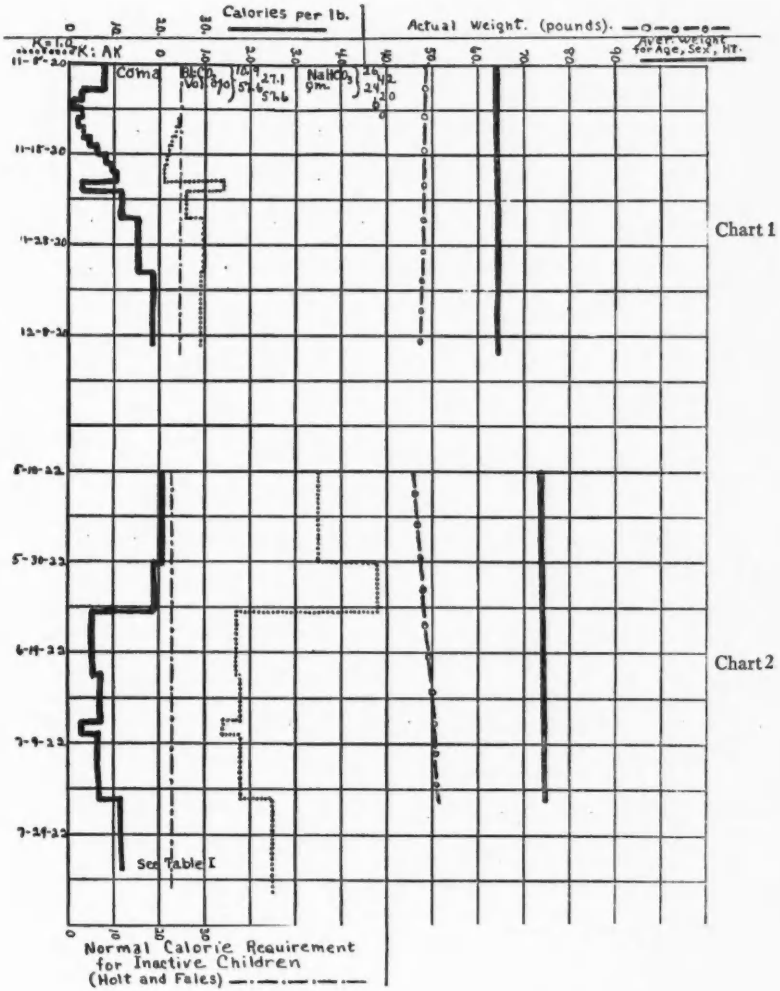

CHART 1. CASE M. M. FIRST ADMISSION

CHART 2. CASE M. M. SECOND ADMISSION

TABLE 1

Representative diet received by M. M. at time of discharge after second period in hospital

C. 5, P. 30, F. 40, calories 500

FOOD	TOTAL	Ca	P	Fe	VITAMIN A	VITAMIN B	VITAMIN C
	grams	*grams*	*grams*	*grams*			
Breakfast:							
Egg	50	0.034	0.090	0.0015	+++	+ to ++	−?
Thriced cooked vegetable	100				−	−	−
Thriced cooked vegetable	100				−	−	−
Milk	10	0.012	0.009		+++	++	+?
Butter	5	0.001	0.001		+++	−	−
Washed bran wafers					−	−	−
Agar jelly					−	−	−
Coffee	250				−	−	−
10 a.m.:							
Washed bran wafers					−	−	−
Lunch:							
Tenderloin	50	0.006	0.108	0.0015	+	++	− to +
Lettuce	20	0.009	0.008		−	−	++
Celery	20	0.016	0.007		− to +	++	−
Agar jelly					−	−	−
Cream of Wheat	10	0.009	0.007		−	++	−
Milk	10	0.012	0.009		+++	++	+?
Thriced cooked vegetable	200				−	−	−
Broth	200				−	−	−
Tea	250				−	−	−
Washed bran wafers					−	−	−
3 p.m.:							
Agar jelly							
Supper:							
Chicken	35	0.005	0.086	0.001	+	++	− to +
Egg	50	0.034	0.090	0.0015	+++	+ to ++	−?
Lettuce	20	0.009	0.008		−	−	++
Butter	5	0.001	0.001		+++	−	−
Agar jelly					−	−	−
Milk	10	0.012	0.009		+++	++	+?
Cooked cabbage	30	0.014	0.009	0.0003	+	++	+
		0.174	0.442	0.0058			
Sherman's estimated requirement for children (1927)		1.000	1.32*	0.015*			

* Figures given only for adults.

three or four days was rather remarkable. Chart 1 gives a record of her progress and treatment during the month she was in the hospital. She was given a fat-free, low protein, under-nutrition diet during the first five days, consisting chiefly of orange juice, egg white and scraped beef sandwich. The carbohydrate and protein were gradually reduced. She was given no food on the sixth day. The diet was then increased slowly

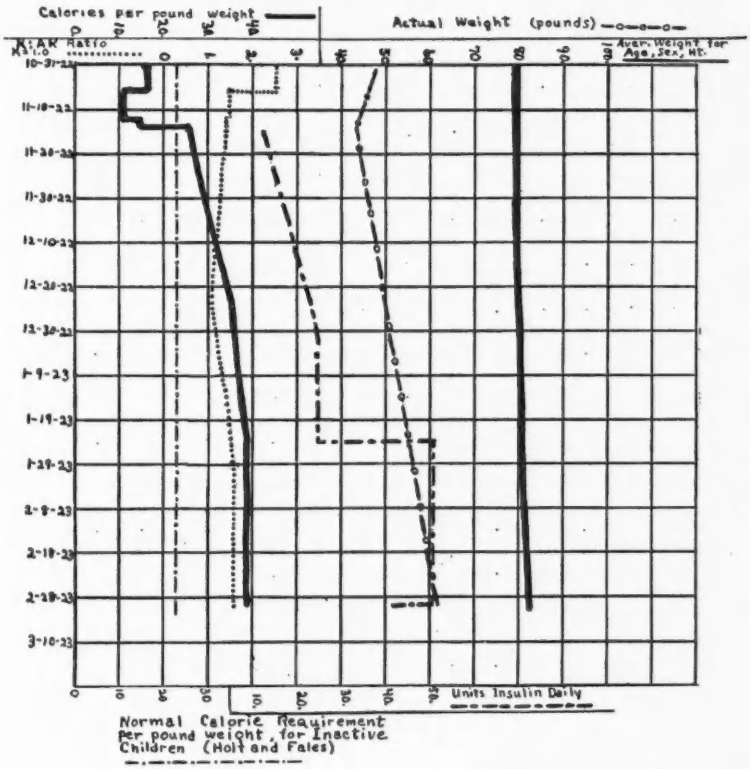
Calories per pound weight
Actual Weight (pounds)
A:AK Ratio
Aver. Weight for Age, Sex, Wt.
Units Insulin Daily
Normal Calorie Requirement per pound weight, for Inactive Children (Holt and Fales)

CHART 3. CASE M. M. THIRD ADMISSION

until she was receiving 30 grams carbohydrate, 50 grams protein and 53 grams fat. The urine was free of sugar and acetone bodies when she left the hospital.

During the following year she was at home, reporting back to the Outpatient Department regularly. Her diet was gradually increased to 50 grams carbohydrate, 65 grams protein and 110 grams fat and her urine

remained sugar-free. In November, 1921, her tolerance began to fall and it was necessary to decrease her food allowance and order frequent fast days. A diet of 10 grams carbohydrate, 25 grams protein and 25 grams fat was as much as she could take without the appearance of sugar in the urine. A tooth with a root pus sac was extracted. She remained very susceptible to colds, however, was weak and troubled with insomnia. The death of her grandmother and other family troubles resulted in her being neglected. She then had to be alternately fasted and given diets of 10–20–20 or 10–20–0.

M. M. was admitted to the hospital for the second time, May 10, 1922, weighing at 11 years 2.4 pounds less than on her previous admission a year and a half before. Chart 2 shows graphically her progress during hospitalization. Her blood sugar was 240 mgm. per 100 cc. and she had sugar and ketones (+) in the urine. She was given a Newburgh and Marsh diet of 14–20–90 for two weeks, but continued to show sugar in the urine, with a mounting blood sugar (345 mgm. per 100 cc.). The diet was reduced to 7–20–90 for 11 days then back to a starvation diet of 0–20–20 for two weeks. She finally became sugar free, was given 5–20–30 with "egg fast days." After ten weeks in the hospital she was discharged July 21, 1922, on a diet of 5–25–50 showing glucose (+) and ketones (+) in the urine. Table 1 shows a menu rather typical of her diet at the time of discharge.

She was described as a total diabetic and was told to rest a great deal. She remained sugar free part of the time outside the hospital but several times a week the urinary sugar would vary from + to ++++. She was never drowsy or nauseated.

M. M. was readmitted to the hospital for the third time October 31, 1922, in coma, weighing 47.5 pounds, even 0.9 pounds lighter than two years previous (see chart 3). Her blood sugar was 330 mgm. per 100 cc. and sugar was being excreted in the urine. For the first three weeks her diet varied from 10–30–70, to 10–30–40, to 20–40–50, with sugar still present in the urine, and her weight fell to 43.5 pounds. Banting and Best had sent some insulin to the Presbyterian Hospital and she was the second patient in New York to receive it. She was given her first injection of insulin (12 units in 3 equal doses) on November 14, 1922. On January 24 she was receiving 50 units and was discharged March 2 on a 40 unit daily prescription. During this time her diet, still of the Newburgh and Marsh type, had increased from 30–50–90, to 70–75–130, to 50–75–150 on which she was discharged. On date of discharge her blood sugar was 417 mgm. per 100 cc. and the urine showed glucose (+). Her weight, however, had increased to 60 pounds.

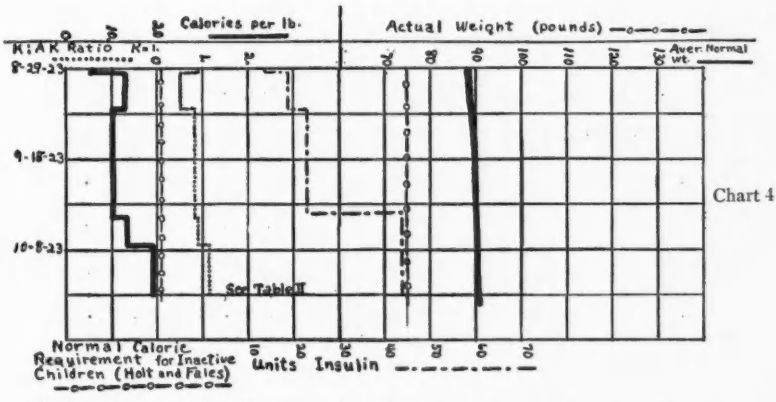

Chart 4

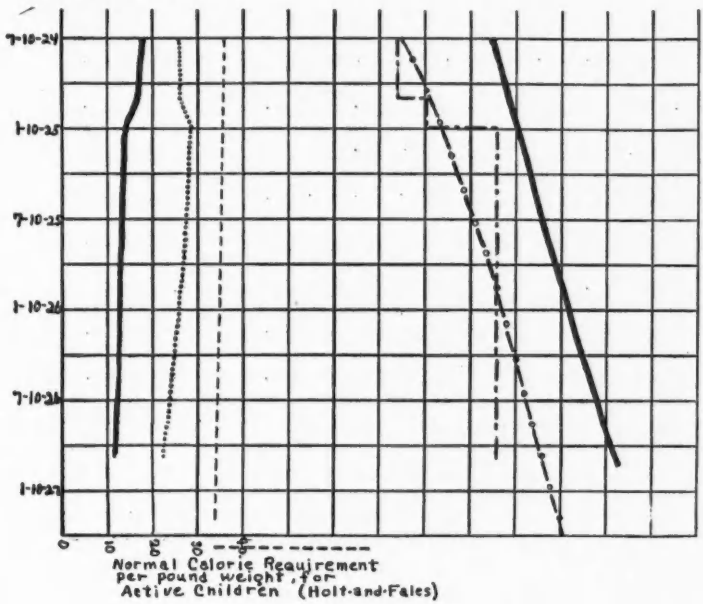

Chart 5

CHART 4. CASE M. M. FOURTH ADMISSION

CHART 5. CASE M. M. RECORD SINCE FOURTH HOSPITALIZATION

TABLE 2

Representative diet received by M. M. at time of discharge after fourth period in hospital
C. 60, P. 60, F. 110, calories 1470

FOODS	TOTAL	Ca	P	Fe	VITAMIN A	VITAMIN B	VITAMIN C
	grams	*grams*	*grams*	*grams*			
Breakfast:							
Cereal	10	0.002	0.013	0.0001	− to +	−	−
Milk	100	0.120	0.093	0.00024	+++	++	+?
Cream	50	0.043	0.039		+++	++	+?
Egg	100	0.067	0.180	0.003	+++	+ to ++	−?
Grapefruit E.P.	100	0.021	0.020	0.0003	+	++	+++
Butter	6	0.001	0.001		+++	−	−
Cocoa shell drink	200				−	−	−
Washed bran wafer					−	−	−
Lunch:							
Roast beef	50	0.006	0.108	0.0015	+	++	− to +
Spinach	100	0.067	0.068	0.0036	+++	+++	+
Tomatoes	100	0.011	0.026	0.0004	++	++	+++
Apple steamed	60	0.004	0.007	0.0002	−	+	+
Cream of Wheat	15				+++	++	+?
Milk	100	0.120	0.093	0.0002	+++	++	+?
Cream junket	15	0.013	0.010		+++	++	+?
Bran wafer (washed)					−	−	−
Butter	5	0.001	0.001		+++	−	−
Cocoa shell drink	200				−	−	−
Supper:							
Asparagus	100	0.025	0.039	0.0010	−	+++	−
String beans	100	0.046	0.052	0.0011	++	++	−
Diabetic dressing	10				−	−	−
Milk	100	0.120	0.093	0.00024	+++	++	+?
Egg custard	50	0.034	0.090	0.0015	+++	− to +	−?
Flavor					−	−	−
Cheese	35	0.226	0.239	0.0005	++ to +++	−?	−
Peas	40	0.011	0.051	0.0007	++	++	++
Cream	20	0.017	0.013		+++	++	+
Butter	6	0.001	0.001		+++	−	−
Cocoa shell drink	200				−	−	−
Washed branwafer					−	−	−
		0.956	1.237	0.01458			

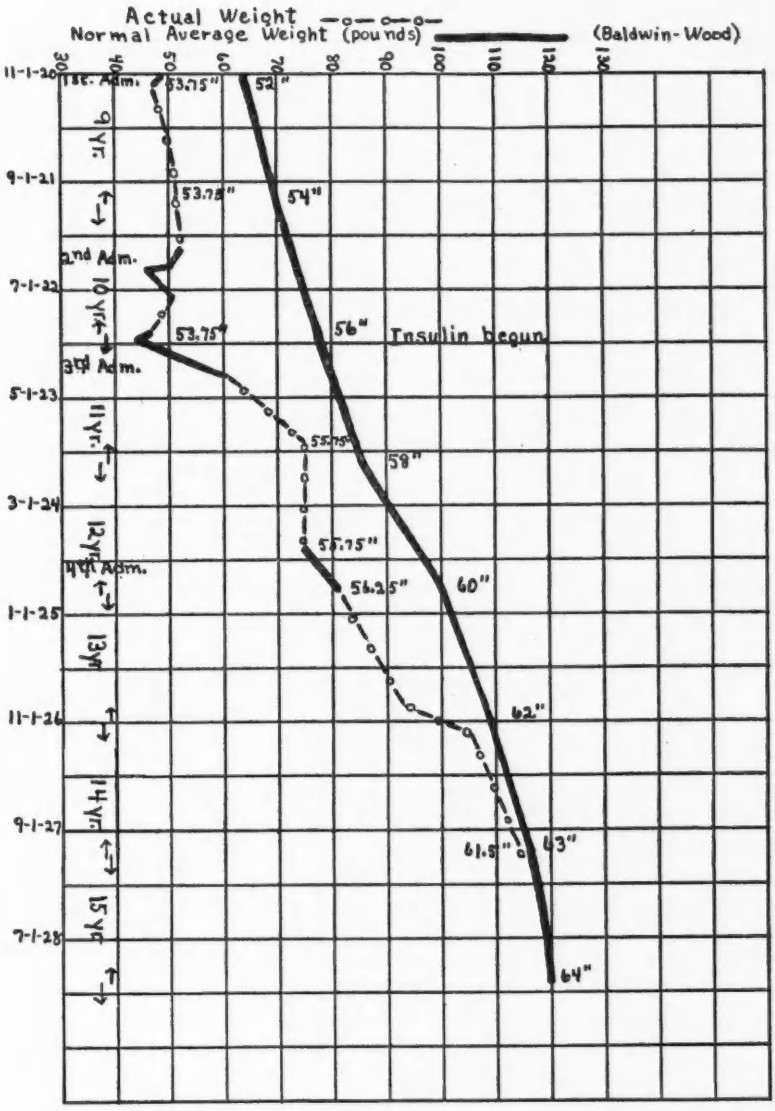

CHART 6. CASE M. M. COMPLETE WEIGHT-HEIGHT RECORD UNDER TREATMENT

M. M. reported back feeling well, but still susceptible to colds which reduced her tolerance from time to time. On July 9 she was ordered a diet of 60–75–120.

She was admitted to the hospital for the fourth and last time August 29, 1923, weighing 74¼ pounds, but with a blood sugar of 459 mgm. per 100 cc. and considerable sugar in the urine. Her diet prescriptions were as follows: 20–20–30 for one day; 60–70–50 for nine days; 40–35–50 for two weeks; 50–45–70 for six days; 60–60–110 for eleven days.

TABLE 3

Record of treatments ordered for H. H., with clinical results

	DIET			INSULIN	K:AK	SHOCKS	BLOOD SUGAR
	C.	P.	F.				
				units			*mgm. per 100 cc.*
February 21, 1924	80	70	100	120	0.82:1	++++	
February 22, 1924	80	70	100	100	0.82:1	++++	
February 29, 1924	Same			100	Same	0 to +	234
March 9, 1924	100	70	150	100	1.06:1	0	254
March 19, 1924	100	70	150	150	1.06:1	+	239
March 28, 1924	150	70	150	150	0.78:1	0 to +	220
March 29, 1924	150	70	75	150	0.39:1		
	Gradual change to						
April 7, 1924	190	70	75	110	0.32:1	0	
April 9, 1924	220	75	75	110	0.25:1	−	
While doing light work H. H. continued to shock slightly, so carbohydrate was gradually increased and insulin decreased to:							
April 15, 1924	220	75	75	100	0.22:1	0	220
May 20, 1924	250	75	105	100	0.36:1	0	200
May 26, 1924	250	75	105	105	0.36:1	0	263

(The above was continued until patient was discharged.)

After 2 to 3 weeks the blood sugar was normal (120 mgm. per 100 cc.) and remained so. The urine was sugar-free. Her insulin dosage gradually increased from 14 units on admission to 44 units on discharge. Chart 4 shows the general results of this period of treatment. Table 2 is a calculated menu typical of the diet on which M. M. was sent home. While at home the general type of diet remained much the same, varying from 60–60–110 to 80–60–80, until September, 1925. Following this it was gradually changed to one of 160–60–50 (insulin usually 66 units) on the belief that a lower fat, higher carbohydrate diet would be more beneficial to her. She has since gone to school regularly and her weight has steadily increased. On October 29, 1927, she weighed 115 pounds,

was a junior in high school and played on the basket ball team. She was not muscular but was in a good state of nutrition. Chart 6 is a general summary of the results of the different kinds of treatment as

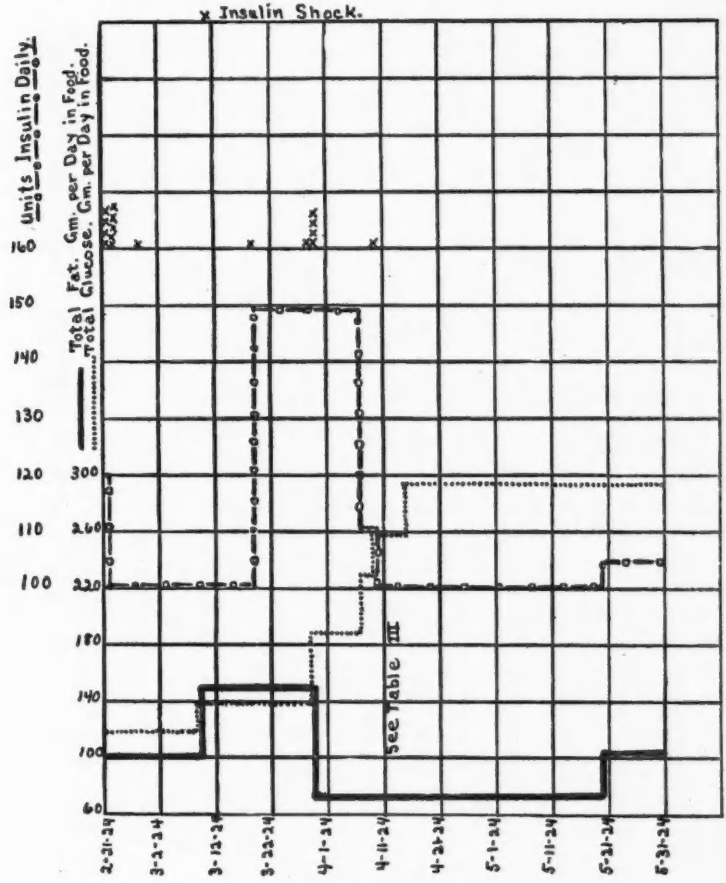

CHART 7. CASE H. H.

they affected her weight and height. (For an interesting study of the growth of a series of diabetic children, *see* Ladd, 1926.)

A patient who illustrates even better than M. M. the advantages of rather liberal carbohydrate and low fat, with insulin, is that of H. H., a

man, whose record during the period in question is shown on chart 6. His diet prescriptions for this period were as shown in table 3.

TABLE 4

Representative final maintenance diet received by H. H.

C. 250, P. 65, F. 80, calories 1980

FOOD	TOTAL	Ca	P	Fe	Vitamin A	Vitamin B	Vitamin C
	grams	*grams*	*grams*	*grams*			
Breakfast:							
Baked apple	130	0.009	0.016	0.0003	−	+	+
Oatmeal	30	0.021	0.118	0.0011	− to +	++	−
Milk	100	0.120	0.093	0.00024	+++	++	+?
Egg	50	0.034	0.090	0.0015	+++	+ to ++	−
Toast	20	0.005	0.018	0.0002	?	+	−
Butter	20	0.003	0.003	0.00004	+++	−	−
Milk to drink	200	0.240	0.186	0.00048	+++	++	+?
10 a.m.:							
Orange juice	200	0.058	0.032	0.0004	+	++	+++
Lunch:							
Egg	50	0.034	0.090	0.0015	+++	+ to ++	−?
Toast	20	0.005	0.018	0.0002	?	+	−
Peas	150	0.042	0.191	0.0026	++	++	++
Bread	15	0.004	0.014	0.0001	?	+	−
Butter	5	0.001	0.001	0.00001	+++	−	−
Milk to drink	100	0.120	0.093	0.00024	+++	++	+?
Fresh pear	100	0.015	0.026	0.0003	−	+	−
Supper:							
Roast beef	70	0.008	0.140	0.002	+	++	− to +
Beets	100	0.029	0.039	0.0006	+	+	+
Spinach	100	0.067	0.068	0.0036	+++	+++	+
Potato baked	100	0.014	0.058	0.0013	+	++	+ to ++
Bread	20	0.005	0.018	0.0002	?	+	−
Butter	10	0.002	0.002	0.00002	+++	−	−
Custard:							
Milk	100	0.120	0.093	0.00024	+++	++	+?
Egg	50	0.034	0.090	0.0015	+++	−	−?
Vanilla					−	−	
Saccharin							
8 p.m.:							
Grape juice	200	0.022	0.022	0.0006	+	+ to +++	?
		1.012	1.529	0.01937			

As will be noted by comparing data given in table 3 with the record shown in chart 6, cutting the fat in half on March 29 and keeping

the rest of the diet and insulin the same resulted in violent insulin shocks. Increasing the carbohydrate gradually from 150 to 250, while reducing the insulin from 150 to 100 units daily, and keeping the protein and fat at 75 each, eliminated the shocks. On April 15, with a diet providing a total glucose of 293 by the Ladd-Palmer (1923) calculation, and a fatty acid of 75, 100 units of insulin were sufficient. On March 19, with a total glucose of 141 and fatty acids 150, 150 units of insulin had been just a little in excess. In other words, 100 units of insulin were able to insure the utilization of 293 grams total glucose in April when fat was restricted to 75. In March 150 units had been able to bring about the utilization of only 140 to 150 grams glucose where 150 grams of fat had been eaten. A liberal fat intake seemed to lessen the effectiveness of insulin. These and similar data have been substantiated by the experiments of Bainbridge (1925) on small animals.

On the higher fat diet H. H. did not feel well and had little strength. On the higher carbohydrate diet he was soon able to work and was no longer depressed; his abdominal pains disappeared and he felt like a different person. Table 4 shows the type of diet on which he was discharged.

Further advantages to diabetics in the use of the high carbohydrate-low fat diet are: It is less expensive; it more nearly resembles a normal diet and hence is more easily adhered to; it is more palatable and permits greater variety; it is much more likely to be nutritionally adequate. These observations are confirmed by the findings of Sansum, Blatherwick, and Bowden (1926).

The data given in table 1 illustrate the nutritional inadequacy of the old starvation diets for growing children, in contrast with the diets represented in tables 2 and 4, the one being rather low in carbohydrate in proportion to fat (60–60–110), the other high in carbohydrate as compared with fat (250–65–80). The menu represented in table 4 more closely resembles a normal diet than does the one shown in table 2 and is a more generally satisfying type of diet.

On charts 1, 2, 3, 4 and 5 it will be seen that only during her third period in the hospital, and after the administration of insulin, was M. M. given a diet containing more calories per pound of body weight than the estimated requirement of Holt and Fales (1921) for inactive children. For a discussion of the food requirements of diabetic children *see* Ladd (1926). During her fourth period at the hospital the diet was purposely reduced, for the patient was regarded as somewhat too fat for her height and age. Periods 1 and 2 and the intervals between were marked by

caloric intakes far below the Holt and Fales average for normal children and the patient lost weight and failed to gain in height. Chart 6 indicates M. M. to be somewhat below average in height, so that her weight was quite satisfactory when last recorded.

SUMMARY

This record is interesting to student of dietetics because it illustrates the results of many kinds of treatment:

1. Low carbohydrate-low caloric diet, alternating with egg fasts and complete fasting (first part of first hospital period and latter part of the second). No insulin was given. This treatment was characterized by loss of weight, no gain in height, susceptibility to colds, insomnia, weakness.

2. Low carbohydrate-rather high fat without insulin (latter part of first hospital period, continued in succeeding year, also first part of the second period in the hospital). No real improvement, little strength or resistance.

3. Newburgh-Marsh type of diet with insulin. Third hospital period, with improvement in weight, but continued susceptibility to colds.

4. High carbohydrate-low fat, with insulin greatly reduced. Continued improvement with increased strength and general well being.

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DIET IN THE TREATMENT OF DIABETES AND ITS COMPLICATIONS*

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Every clinician treating any considerable number of diabetic patients has his own methods and scheme of management, and there are almost as many different plans as there are clinicians. But there are some principles so fundamental that they are accepted by all; these are of sufficient importance to merit emphasis and repetition. In my opinion, simplicity of the method of presenting the subject to the patient is of such prime importance as to justify omission of minor details.

A diet for a diabetic patient must necessarily meet successfully the following requirement: It must provide sufficient nutrient value (calories) to maintain proper weight and growth and furnish necessary energy for the required activity. This implies, first of all, a protein allowance sufficient to maintain nitrogen equilibrium (that is, sufficient protein for the normal katabolism of the adult and the additional amount required by the growing child). How much should that be for an adult? About 0.6 gram of protein per kilogram of the body weight. This brings up the question as to what is the ideal weight of the diabetic patient. This may be either the normal weight of the person of that age, height and sex, as shown in the standard tables, or, preferably, 10 per cent below this normal figure.

There are some who maintain that the diabetic patient can take as much or more protein than the healthy person without disadvantage, but I know of none who believes that the patient should do so. We have the opinion of Lusk and many others who assert on good evidence that the above mentioned ratio is not only adequate, but that an increase above this figure results in a less economic metabolism in general and a particular disadvantage to the carbohydrate balance (the specific dynamic action of protein). My impression is that when I increase the diabetic patient's ration of protein above this point it requires relatively more insulin to control hyperglycemia and glycosuria than on the smaller

* Read before the American Dietetic Association, Washington, D. C., October 30, 1928.

ration of 0.6 gram of protein per kilogram of body weight. Wilder has presented some figures which seem to substantiate this.

What is the most suitable allowance of carbohydrate? In answer to this, it should be stated that while it is possible to maintain a fair degree of health and reduced activity in an adult on a diet low in carbohydrate (for example, 30 to 40 grams per day by the utilization of very large amounts of fat in the diet), in practice it is unsatisfactory, undesirable and, now that we have insulin, unnecessary. Without discussing basal metabolic requirements, it may be stated as a clinical fact that an adult diabetic will do far better when receiving from 60 to 75 grams of carbohydrate per day. Let us see where this practice would lead us. Seventy grams of carbohydrate will provide 280 calories. A patient weighing 150 pounds (68 kilograms) will require 40 grams of protein. But in order to avoid the difficulty of adjusting this too closely with theoretical calculations and to insure an adequate protein intake, let us allow 50 grams of protein. This will provide 200 calories. Such a patient will require approximately 1700 calories for very moderate activity. The above protein and carbohydrate allowance will provide 480 calories, thus leaving a deficiency of 1220 calories to be provided by 135 grams of fat.

The amount of fat prescribed in diabetes deserves some special comment. There has been much discussion concerning the advantages and disadvantages of a high fat diet and the ketone-antiketogenic ratio. According to those who advocate a high fat diet, this 135 grams is low, but according to all, it is admitted to be safely within the ketogenic limit. Why not give much more fat and reduce the carbohydrate, thereby possibly avoiding the use of insulin in the marginal cases? In my opinion, we have cogent theoretical and clinical reasons for avoiding what may be called the maximal fat ratio. They are, briefly, as follows: The diabetic patients who do not die of ordinary disease or accidents not related to diabetes die of one of the following three things: Coma alone, coma plus infection, or some disease process based upon pathologic changes in the arteries.

Briefly, arterial disease is the great menace of the diabetic who may escape all other pathological dangers. For example, arterial disease prevents many mild infections from healing, thus resulting in extensive tissue death, often requiring amputation. Such tissue death greatly predisposes to acidosis and coma. Consent to the necessary life-saving amputation often cannot be obtained until such procedure is futile.

What is the relation, if any, of fat to arterial disease? One of our most experienced clinicians in this field (Joslin) points out that too much

fat is an important factor in producing diabetes. Too much fat predisposes to acidosis and coma, and there are evidences that a high fat diet increases or hastens the development of arterial disease. For example, it is known that fat is the source of lecethin. Lecethin is found in some gall stones (another menace to the diabetic patient), and in the early changes in diseased arteries. Under these circumstances, does it not seem a reasonable precaution to avoid excess of fat in the diet of a diabetic patient?

We now come to the most important practical problem presented by the diabetic patient, namely: How shall we teach the patient to eat daily just 70 grams of carbohydrate, 50 grams of protein and 135 grams of fat, or whatever modification of this ration the individual case may require? So long as the patient is in the hospital where trained dietitians are available neither the doctor nor the patient need worry about this, but the crucial test of all our theories and practical methods occurs when the patient goes home. If the method used in teaching is too refined, elaborate and cumbersome, or provides a monotonous diet, the patient, not appreciating the dangerous complications threatening, will not practice such a difficult procedure for a week, much less for the remainder of his life.

In my opinion, the necessary instruction is best accomplished by giving the patient a typewritten or printed sheet of some basic diet; for example, carbohydrate, 70; protein, 50; fat, 135; with the amount to be taken at breakfast, lunch and dinner specified, for example, as vegetables from the 5 per cent group; fruit from the 10 per cent group; and oatmeal, eggs, cream, bacon, butter and lean meat in definite amounts. (For this purpose I usually make use of a printed card taken from a publication of Dr. Joslin's.) This diet should be followed exactly for a few days and then the patient should be taught simple substitution, written examples being given for vegetables, oatmeal, fruit, eggs, cheese and lean meat. The following table is given as an illustration.

Regular diet

Carbohydrate, 74; protein, 52; fat, 88; calories,1296

A.M.

15 grams oatmeal—raw weight
15 grams bread
1 egg
15 grams bacon
40 grams cream
10 grams butter
100 grams orange

Noon

300 grams 5 per cent vegetables
60 grams meat
40 grams cream
10 grams butter
100 grams orange

P.M.

300 grams 5 per cent vegetables
1 egg
15 grams bacon or cheese
40 grams cream
10 grams butter
100 grams orange

The substitutions suggested, of course, are not absolutely equivalent, but they approximate sufficiently to be used by the patient without producing important variations in the desired diet.

		Substitutes
1 egg	equals	15 grams cheese or bacon
40 grams cream	equals	10 grams butter
30 grams bread	equals	30 grams oatmeal—dry weight
15 grams bread	equals	300 grams 5 per cent vegetables
2 Uneedas	equals	300 grams 5 per cent vegetables
2 saltines	equals	1 Uneeda
2 saltines	equals	150 grams 5 per cent vegetables
50 grams potato	equals	300 grams 5 per cent vegetables
180 grams whole milk	equals	1 egg and 1 orange
45 grams walnuts	equals	1 egg plus 150 grams 5 per cent vegetables, plus 60 grams cream, plus 10 grams butter

Instead of 100 grams of orange, *any one* of the following may be used:

	grams		*grams*
Peaches	76	Canteloupe	100
Blackberries	100	Strawberries	150
Watermelon	150	Bananas	50
Raspberries	85	Grapefruit	200
Blueberries	65	Apples	66

Instead of 30 grams of oatmeal (dry weight) *any one* of the following may be used:

1 shredded wheat biscuit
3 triscuits
4 Uneedas
100 grams bananas
30 grams cream of wheat
30 grams bread

The patient should also receive a similar sheet giving the same diet in a liquid form, to be used in case of illness.

Liquid diet

Carbohydrate, 74; protein, 52; fat, 88; calories, 1296

A.M.

* 2 eggs
2 oz. cream
6 oz. whole milk
Juice of 2 oranges

Noon

2 eggs
6 oz. milk
2 oz. cream
½ orange

P.M.

* 2 eggs
6 oz. milk
2 oz. cream
2 oranges

The carbohydrate equivalent of the C 7 Diet is 7 oranges.

* This may be given as eggnog and orange juice given 20 minutes later.

Return to full diet may be preceded by the following soft diet:

Soft diet

Carbohydrate, 74; protein, 52; fat, 88; calories, 1296

A.M.

30 grams oatmeal (dry weight) or 30 grams toast
80 grams cream
1 egg, soft cooked
100 grams orange

Noon

15 grams bread, toasted
10 grams butter
40 grams cream
240 grams milk, 1 egg } made into soft custard
30 grams white meat of chicken

P.M.

1 egg
240 grams milk
5 grams butter
60 grams cream
1 Uneeda biscuit

The patient should be instructed as to the early symptoms of acidosis, in order that attacks of nausea, vomiting or pain in the abdomen (which usually ushers in acidosis) should not be treated as indigestion, by

withholding food. Unfortunately, this is just what occurs only too frequently. For example, the patient leaving the hospital in good condition, on a suitable diet and taking a properly adjusted dose of insulin, may relax this régimen and may continue to feel well for some time, and then, under some unusual stress will develop these symptoms, and, before the true condition is realized, will be in an advanced state of coma. This is an exceedingly expensive and dangerous way of gaining knowledge. Such unhappy results can only be avoided by adequate education of the patient or some member of the family. This does not mean that the patient must know as much about the diabetic diet as does the dietitian, nurse or doctor, but unless the patient *knows enough* to carry out directions and alter the menu sufficiently to provide a simple, varied and accurate diet, our treatment will be a failure.

In discussing diet in the complications of diabetes, acidosis and coma should be mentioned first, because any and every complication predisposes to acidosis, and this grave condition threatens life before the other complication can be treated. In this connection, all who have anything to do with diabetes should have it deeply impressed upon their minds that acidosis is most insidious in onset and is far advanced before alarming symptoms develop. In my experience, several if not all of the following circumstances preceded acidosis and coma and may, therefore, be named as predisposing causes:

1. Travel, either by railway or automobile.
2. Failure to take, or retain, the prescribed diet—(omission of food, or attacks of nausea, vomiting and diarrhoea).
3. Omission of insulin.
4. Infection of any kind.

The onset of acidosis is not accompanied with unconsciousness or coma, but with restlessness, gastro-intestinal disturbance, nausea, vomiting—even of dark bloody material, constipation, and pain in epigastrium becoming so severe that an acute inflammatory process may be suspected. Later, deep breathing, somnolence and unconsciousness follow.

The treatment is, first of all, by diet. The patient should receive carbohydrates equal to the total dextrose of his prescribed diet—that is, from 100 to 150 grams of carbohydrate in 24 hours. I know of no exception to this rule. From 6 to 8 glasses of orange juice in 24 hours will supply this amount. Fluids are of equal importance, and if liquids taken by mouth cannot be retained, normal saline may be given by proctolysis, but the latter is unsatisfactory to me because it may be retained for a while and expelled without adequate absorption and may

provoke or cause a persistence of the vomiting. Normal saline, 500 or 800 cc. by hypodermoclysis, four or more times in 24 hours is more reliable. This is urgently necessary.

A movement of the bowels should be insured. Enemas are usually futile only the water returning without any adequate evacuation of the bowels. Croton oil, 4 minims in 1 drachm of glycerine, will usually be successful.

Insulin should be given in doses sufficient to reduce the hyperglycemia and the glycosuria and to burn the sugar in the blood and the carbohydrate given by mouth. This usually requires from 80 to 120 units of insulin in 24 hours. The amount given must be controlled by the determination of the blood sugar and the carbon dioxide combining power of the blood. Sodium bicarbonate is given by some, but I prefer to rely on the burning of carbohydrates for the control of acidosis. Diet is also of first importance in any infection, whether it be pneumonia, tuberculosis, carbuncle, or some infection of the extremities.

Whenever any surgical operation is required, the closest coöperation between the surgeon and the physician is imperative.

Two conditions must be avoided, namely: fasting and dehydration.

Prior to an operation of election, the patient should be so managed that the blood sugar is within normal limits, and he must receive food up to within a few hours of the operation. The last few meals may be in liquid form and may provide only the prescribed amount of total dextrose. Determinations of blood sugar and carbon dioxide combining power of the blood should be made just prior to, and within an hour or two after, the operation. It is quite practicable to give carbohydrate in the required amount in a liquid form up to within two or three hours of the operation and to resume the same form of feeding within two to four hours after the operation. And, of course, insulin should be given in that particular case.

Food in liquid form, for example, orange juice, should be given in the required amount as soon as the patient reacts from the anaesthetic and, when possible, gas or ethylene should be used in order that reaction may be prompt and the fasting period reduced to a minimum. In the case of emergency operations, where time does not permit the preparation of the patient by diet and insulin, these should be instituted immediately after the operation, and the results checked by frequent blood examinations, in order that post-operative acidosis may be prevented.

Conscientious and painstaking attention to the above principles will still further reduce the present high mortality in infection and operation in diabetic patients.

STANDARDIZING THE BABY SOFT DIET

FRANCES B. FLOORE
Dietitian, University of Michigan Hospital

After the baby has been weaned, either from the breast or the bottle, he is ready for what we term a "baby soft diet." From the fourth or the fifth month he should have been receiving small amounts of strained oatmeal or farina and a puréed fruit or vegetable. With the egg yolk, the orange juice, and possibly a vitamin B concentrate added to the formula, his diet has so far been complete.

The change has, therefore, been gradual and we have accustomed him to semi-solid food, so that, in changing over to this diet, there should be little difficulty in his food adjustments. The formula will be replaced by milk (without additional sugar) which should be boiled for at least one minute as a matter of protection; this procedure should be continued for several years. All the vegetables and fruits should be strained and the ripe banana should be put through a ricer or mashed with a fork before serving. In the hospital where one has access to diabetic fruits, peach or pear purée can be given in the unsweetened form.

The accompanying chart has been prepared for use in the University Hospital in serving large numbers of babies between the ages of one and two years. It includes all of the foods necessary in a young child's diet and gives the nurses a comprehensible idea of what we mean by a baby soft diet. A copy of this chart, covered with isinglass and bound with adhesive tape, is hung in the diet kitchen so that the nurse preparing these trays may know exactly what to serve from day to day. The caloric content is calculated for each day as well as the number of grams of protein, fat and carbohydrate. It is also necessary that we think of this diet in relation to the amount of calcium, phosphorus and iron, and these figures are added to the chart together with the weekly average. A child of this age needs one gram each of calcium and phosphorus and six milligrams of iron. The menus have been calculated to incorporate these amounts in the diet. In being thus standardized, the diet might be considered a monotonous one, but the child of this age does not need a great variety of foods. If he is given well cooked, nourishing food, simply prepared and served, he will be satisfied. As to the amount of

BABY SOFT DIET

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	AMOUNTS
Breakfast 7 a.m.							
Orange juice	Orange juice	Orange juice	Orange juice	Orange juice	Orange juice	Orange juice	½ glass
Oatmeal	Farina	Oatmeal	Farina	Oatmeal	Farina	Oatmeal	½ cup
Milk	Milk	Milk	Milk	Milk	Milk	Milk	1 glass—7 oz.
Gr. cracker	Gr. cracker	Gr. cracker	Gr. cracker	Gr. cracker	Gr. cracker	Gr. cracker	One
Dinner 11:30 a.m.							
Coddled egg	Cr. gr. liver	Scr. yolks	Thick veg.	Coddled egg	Scr. yolks	Cr. gr. liver	1 tablespoon
B. potato	Rice	M. potato	Soup	B. potato	Rice	M. potato	2 tablespoon
Spinach	Carrots	Tomato	Gr. cracker	Spinach	Carrots	Tomato	2 tablespoon
Milk	Milk	Milk	Milk	Milk	Milk	Milk	1 glass—7 oz.
Junket	Tomato Jello	Bananas	Custard	Junket	Banana	Apple sauce	2 tablespoon
Supper 5 p.m.							
Farina	Oatmeal	Farina	Oatmeal	Farina	Oatmeal	Farina	½ cup
Milk	Milk	Milk	Milk	Milk	Milk	Milk	1 glass—7 oz.
Apple sauce	Prune Purée	Peach Purée	Banana	Apple sauce	Orange Jello*	Prune Purée	2 tablespoon
Gr. cracker	Zweiback	Zweiback	Zweiback	Gr. cracker	Zweiback	Zweiback	One
Before Bedtime							
Milk	Milk	Milk	Milk	Milk	Milk	Milk	1 glass—7 oz.
P. 46 Ca. 1.232	P. 43 Ca. 1.268	P. 39 Ca. 1.099	P. 43 Ca. 1.123	P. 42 Ca. 1.220	P. 42 Ca. 1.098	P. 42 Ca. 1.276	Average
F. 45 P. 1.128	F. 44 P. 1.10	F. 46 P. 1.090	F. 44 P. 1.034	F. 45 P. 1.164	F. 40 P. 1.050	F. 50 P. 1.036	P. 424 Ca 1.188
C. 130 Fe. 0.009	C. 133 Fe. 0.008	C. 121 Fe. 0.005	C. 121 Fe. 0.005	C. 130 Fe. 0.008	C. 147 Fe. 0.007	C. 150 Fe. 0.009	F 45 P. 1.086
							C 134 Fe 0.007
Cal = 1109	Cal. = 1100	Cal. = 1080	Cal. = 1052	Cal. = 1093	Cal. = 1116	Cal. = 1218	Cal. = 1109

food that the baby can take, he is, after all, one of the best judges. The quantity with which one child will gain and be satisfied, will cause another to lose weight and be hungry. Second servings are given to those who wish for more.

In conclusion, a word should be said regarding the importance of giving instructions to the mother. It is not unusual to find that, when a baby is weaned from the bottle, he is expected to eat at the family table and partake of food prepared for the adult members. This type of feeding tends to impair his digestive powers. As a child of this age is likely to be thus neglected in the home, it is very important that the mother be given instructions for the feeding of her child during this period. Therefore, when the baby is discharged from the hospital, the mother is given a list of foods to include in the diet together with a set of printed recipes.

EDUCATING THE PUBLIC IN GOOD HEALTH HABITS

LUCY H. GILLETT

Nutrition Bureau, New York Association for Improving the Condition of the Poor

Methods for educating the public in good health habits involve the same principles that must be applied in disseminating any other subject matter. To be effective, the presentation must be adapted to the group to be reached, with due consideration for the social and perhaps financial standing of the individuals of which the group is composed. It must catch the attention through brevity and attractiveness. The same facts must be repeated any number of times at intervals over a period of months or years. They must be said in a variety of ways; they must be practicable and workable. And frequently a striking demonstration at the very beginning is a wise move to arouse a nutrition consciousness. In general, the public must have its material presented one idea at a time, not only in such simple form that "he who runs may read" but so "catchy" that he will pause long enough to read it a second time.

Also, before attempting to plan any program, there are various questions to be considered. Among them are the purpose of the work and the age group, or groups, to be addressed. Is it proposed to help only those below par or is the plan to prevent sickness among those that are well? Does one desire to reach the infant, the pre-school child, the school child, the adolescent, the adult, or some special group? The money available must also be considered. With sufficient financial backing an excellent program for both remedial and corrective work may be planned for *all* ages. Where one worker must cover a large area on a limited budget, she will have to decide whether to do intensive work with the individual, thereby reaching only a few, whether to teach preventive measures to those already in good condition and thus help to protect thousands from becoming malnourished, whether to act as a consultant for other welfare workers and teachers who, in doing the actual work involved in carrying out the nutrition program, may help tens of thousands, or whether to serve as a stimulator and coördinator in arousing public interest in the nutrition problems. There are various arguments for each of these possible methods of approach and circumstances will influence any decision.

Curative or remedial work is slow and an expensive process. It requires individual attention with repeated conferences, follow-up, and perhaps home visits. At best, even though the work be done in classes, one worker can reach comparatively few people because of the length of time it takes to uproot old habits, establish new ones, and adjust the many specific problems which arise in connection with each case. With remedial work only, there can be no end to malnutrition as the places of those who become normal will be forever filled from the ranks of those who have not been taught preventive measures. A program conducted through large groups, or through general education methods such as the use of literature, fliers, posters, films, newspaper articles, health parades, contests, plays, mass meetings, and the like, may keep thousands in good condition, but it will not so effectively deal with those already malnourished. It should, however, in time bring about a higher percentage of good nutrition.

Where the ill-effects of malnutrition are already appreciated, where the people are ready to respond to health teaching, and where the budget is small, a general program is suggested. But if the public is skeptical as to the seriousness of malnutrition, if it is thought to be overrated, if prevention is thought to be unnecessary and just a fad, then because the human aspect of helping those in need appeals, intensive work is frequently a wise move as an approach to more general work at some future date.

On all sides we hear discussed the desirability of having the nutrition work done by the general welfare workers and teachers under the supervision of the specialist; as more children may be reached through the many teachers and welfare workers than through one specialist, it is desirable to have these workers informed, so that they in turn may teach good health habits in every family in which they have any influence. Probably this is the best use to which many specialists may devote their time, especially when they have large territories for which they are responsible. But we must keep in mind that where malnutrition already exists it requires something more than repeating instructions to get results in terms of well-nourished children. For results in any given instance there must be conviction on the part of the worker, who in turn must convince the family; there must be concentration to discover the reasons for malnutrition in any given case; long hours are often necessary to make conditions possible for a child to gain; there must be forceful persuasion and patient encouragement with a continued interest over a period of months until health habits become automatic. More than a

superficial knowledge of the causes and remedies of malnutrition, and the methods of overcoming it, is necessary. When the general health or welfare workers will take the time to become informed, and when they can spend the time to get results, it will mean much in the nutrition of our boys and girls, because of the larger number benefited.

Personally, I feel that in those communities large enough to warrant several workers the malnutrition cases should be handled by the specialist, but at the same time this person should instruct the other welfare workers, who will do the major part of the nutrition work through preventive measures which will be carried into every home.

At the Mulberry Health Center, where mothers speak very little English, and where they are quite unconscious of the wave of enthusiasm concerning the importance of child welfare which has swept the country, general educational methods would have been impracticable and have met with certain failure ten years ago. To these women, their children were just naturally thin, and they were considered well if not sick enough to have a doctor (unfortunately this delusion is not confined to this group or even to foreign groups in general). We frequently hear them say "Tony, he takes after his father; he was always thin and I guess there is no danger," or "All my children, they got bow-legs when they was small but they straight now. I no bother." Such is the mental attitude of many foreign groups who cannot attend public lectures, read our literature, or who do not understand the trend of the times. To have carried this message of prevention to this group, at the beginning of our health work among them, would have been wasted energy. Therefore, Mary Harper, then in charge of the nutrition work in the Mulberry district, selected sixteen or twenty of the worst specimens of malnutrition as the basis of a class in which to demonstrate the value of good health habits. She taught them in a group, but worked with them individually until they were in excellent condition. The transformation in these children from pale, listless, undersized boys and girls into healthy, rosy-cheeked specimens, full of life and energy, though often a bit "too fresh," as one easy-going mother expressed it when she meant that her boy was too full of life for her to discipline properly, demonstrated the difference between good and poor nutrition. But while this class helped to drive home the need of corrective work, and, to some extent, preventive work for the school child, its application did not carry over into the pre-school period, and still further work was necessary to teach the value of prevention during the early years.

As these mothers could not be persuaded to attend public clinics or

classes regularly, enough nutrition workers were added to the staff to admit of intensive work in the homes wherever malnourished preschool children were found. Then not only the parents, but neighbors and friends became interested in the changes taking place in the physical condition and appearance of the boys and girls, and the value of preventive measures began to assume an air of importance. As those who were below par responded and became stronger, healthier, and better looking than those supposed to be well, mothers were encouraged to try some of the new methods on the latter; as they improved, the mother told a neighbor, a neighbor told a friend, the friend in turn passed the wondrous news to an acquaintance, and so the story spread. In this particular instance well-trained nutritionists were used to do the actual work with mothers and children; no others had the time required to get results; without results, we would have been minus a demonstration with which to arouse the interest of the people.

Meanwhile the nurses were being taught the elements of nutrition which they passed on to every family visited. The nurses, also, were working just as earnestly with physical defects and other health problems as the nutritionists were with good health habits; as a result of combined efforts with individuals and families, more general methods were possible, and for the past four or five years the nutrition work in this district has been conducted along lines of community projects.

Throughout the demonstration an examination of the teeth of these children who went through the clinics showed a deplorable condition. Children averaged five or more cavities, many of them so far advanced that it was impossible to save the teeth, and many of the mouths were doubtless endangering the nutritional state of these boys and girls. The dental problem loomed in the foreground in a two-fold nutritional sense, as it pointed out the need of educating the mothers in laying the foundations for sound teeth during pregnancy, the nursing period, and during the early years of childhood; it also emphasized the correction of mouth conditions which were menacing health. This dental project also gave us an opportunity to repeat our nutritional instruction from another point of view.

The responsibility of having these thousands of cavities filled was too huge a task for even two or three workers to undertake. Therefore resourceful Joelle Long, now in charge of our nutrition service in the Mulberry district, proceeded somewhat as follows: she reasoned that these children should be stimulated to take upon themselves the responsibility of caring for their teeth, but both mothers and children were quite un-

concerned and indifferent; they felt that if teeth decayed there was nothing to do about it but suffer the consequences. So Miss Long then offered, and still offers, a reward each year to any room in any school in which all the children have their teeth in good condition by a certain date. The reward is given to the room, not to the individual child. In this way the teachers take more interest, which is important for several reasons: first, they have influence with, and are able to encourage the children, where obviously we might be accused of showing partiality; secondly, with the teacher interested, there is hope that she will continue her efforts after we withdraw from the school; and thirdly, such a contest naturally requires that some of the dental work be done during school hours and again we must have the coöperation of the teacher. Each successful class has been allowed to decide how it will spend the money allotted to it. One class gave a concert for the benefit of the whole school; another selected a victrola; and one preferred to go on a picnic, while others have selected books or pictures.

But the work cannot end with the offering and presenting of the prize, for if the idea is effective, any number from 100 to 1000 children may descend upon a clinic all at once and the pandemonium which would ensue would end the coöperation which the clinics are now willing to give and without which the work would be impossible. Arrangements must be made with the dental clinics to take a certain number of children at stated hours during the day, plans made with each teacher as to the hours that will best meet her convenience, appointments made with the children to go to the clinics at these hours. The children's plans will depend upon their success in persuading their parents to give them the money for the work; if the clinic is some distance from the school, the children must be accompanied by an adult who may be needed to keep those not in the dentist's chair within bounds. In connection with the contest, leaflets on the care of the teeth, with emphasis on eating for better teeth, are distributed among the children; material is given to the teachers for use in their regular class work, and posters are often placed in the halls of the school buildings. We hope that if these contests are continued over a period of years, the habit of semi-annual or annual trips to the dentist will have been formed for life. While the importance of good teeth as an aid to health is used as an argument for dental care, children of this age are much more impressed with its present advantages such as an improvement in personal appearance, but we care not what the motive so long as the habit of keeping the teeth in good condition is formed. One boy whose mouth

was most unsightly, was not at all interested in having anything done about it, but was finally persuaded by his companions to be a sport so as to give his class a perfect record and a prize.

In this same Italian district, where rickets is very common and the death rate from pneumonia is very high, the nutritionists and nurses have been jointly waging war against rickets through a general program organized somewhat as follows: A list of cod-liver oils, labels of which state that the oil contains vitamin A (vitamin A, because it is felt that if A is present D will be also, and very few oils have been tested for D), has been prepared and a copy given to each family in the neighborhood with the advice that it is safest to use only such oils as are thereon listed. Each family is visited by a nurse, told the importance of cod-liver oil and sunshine, instructed how to give the sun-baths, and given literature relative to proper food for pregnant and nursing women, and babies. Posters emphasizing cod-liver oil are displayed in each drugstore window, and food posters are to be placed in other strategic places this year. Slides have been prepared, furnished to, and shown by movie houses in the district once a month. Thus far it is too early to measure results through decreases in the amount or severity of rickets, but several cod-liver oil companies have reported substantial increases in the sale of their products and have real evidence that mothers will not let the druggists sell them an inferior product with the statement "it is just as good." Working on the principle that ideas must be repeated several times before they become established habits, the campaign which started last year is being continued this year with different publicity material.

Although we have confined our rickets campaign to the Mulberry district, one of the Italian newspapers has just recently asked our coöperation in a campaign conducted through its columns so that all Italian families in the city may be benefited thereby.

In the Bellevue-Yorkville Demonstration district where the people are more progressive, not so retiring, and therefore more ready to respond, the nutrition service is being introduced through entirely different methods. Our aim is to make the people eager to come to the center for advice instead of waiting to have it taken into their homes. Slow intensive work seemed unnecessary, and general educational methods and consultation with other health workers have been used from the beginning. The Food-for-Health Show in 1928 contained diets for pregnant and nursing women prepared by the Visiting Nurse Service; feeding of infants was exhibited by the Baby Health Station; there was an exhibit

emphasizing the value of cod-liver oil and sunshine, and proper food in the prevention of rickets; food for good teeth was stressed; meals for different ages were demonstrated; a proper picnic luncheon was spread upon a grassy meadow under a shady tree; there was an animated cow from the Dairyman's League; and white rats in varying degrees of nutrition as the result of improper feeding attracted much attention. In addition there was a health fortune-telling tent, two attractoscopes, a real push cart loaded with fruits and vegetables for health; nutrition posters made by the children in the schools of the neighborhood adorned the walls, and various other attractions brought nearly a thousand a day to see the exhibit. Each afternoon there were health films or plays to entertain the children, and each evening a film or play plus a talk by a doctor, dentist or other public health worker was given for the benefit of the parents.

Boy and Girl Scout troops were brought into service, the girls demonstrating the making of appropriate foods for children from two to six years of age, and the boys helping to guard the exhibits from the fingers of interested children.

To gain attention, Miss Holman gave tickets to the grocerymen in the district for distribution to their customers; she also gave a ticket to each school child. As each ticket was marked complimentary, there was a grand rush to see the show.

This exhibit is now being followed by slow-moving publicity in which only one thing at a time is stressed. Next to the teacher the groceryman comes nearest to meeting all the families in the district and is therefore in a strategic position to broadcast educational material, but naturally he is more interested in the money than in the effect of coffee on growing children, or the lack of mineral elements and vitamins in white or refined cereals. Miss Holman had a bright idea which she pursued by canvassing the district, selecting the names of 125 dealers who looked promising, and sending to each a letter outlining a Food-for-Health Contest, whereby the demonstration would give a silver cup for the best window display, the display to consist only of vegetables, fruit, milk, and dark cereals. Of the 125 people to whom letters were sent, twelve responded. These were given talks on good window display, the importance of cleanliness of surroundings, and the value of the foods to be displayed. At the time appointed there were eight surprisingly good exhibits. In planning further educational features in which the grocerymen will be asked to take part, we are now assured of their support, as several have said "We will

do anything the Bellevue-Yorkville Health Demonstration wants us to do."

These illustrations are taken from the many bits of educational work being conducted under the supervision of the Nutrition Bureau of the Association for Improving the Condition of the Poor. They serve to show how the method must be adapted to the group. Our aim is always to be brief, clear, practical, forceful and interesting.

EDITORIAL

The Journal of Home Economics for June 1929, contains a leading article on the dedication, December 3, 1928, the eighty-sixth anniversary of her birthday, of a bronze tablet to the memory of Ellen Henrietta Swallow Richards at the Massachusetts Institute of Technology. It carries a bas-relief portrait by Bashka Paeff, sculptor, below which is the following inscription:

ELLEN HENRIETTA RICHARDS
1842–1911
VASSAR COLLEGE A.B. 1870—A.M. 1873
MASSACHUSETTS INSTITUTE OF
TECHNOLOGY S.B. 1873. FIRST WOMAN
GRADUATE INSTRUCTOR IN SANITARY
CHEMISTRY 1873–1911. SMITH COLLEGE
SC.D. 1910. LEADER IN THE FIELD OF
PUBLIC HEALTH AND PIONEER IN
HOME ECONOMICS SHE STROVE FOR
BETTER LIVING CONDITIONS AS A FIRST
STEP TO HIGHER HUMAN EFFICIENCY

The tablet was the gift of Mrs. Richards' friends. Frances Stern, chief of the Food Clinic at the Boston Dispensary and former chairman of the Social Service Section of the American Dietetic Association, was chairman of the committee in charge. Miss Stern has the enviable distinction of having been a former pupil, friend and follower of Mrs. Richards in the home economics profession. Dr. Augustus H. Gill, '84, associate of Mrs. Richards and professor in the chemical department of the Institute, was chairman of exercises of the unveiling.

The sentiments of the speakers at the dedication, many of whom were privileged to have been associates, friends, or pupils of Mrs. Richards, revealed her to those who had not known her, as a devoted seeker of scientific truths, in their application to community and household problems, yet a womanly woman, "sensitive to beauty," courageous, modest, one "who carried out in her own household all the principles of home economics which she was so vigorously and effectually promulgating."

M. P. H.

Floor Space, Storage, and Refrigeration in Hospital Kitchens

Restaurants, hotels and cafeterias, those institutions which make a business of food preparation, have established certain satisfactory allowances for the size of kitchens. Hospitals are also in the business of food preparation and it is therefore important to determine the amount of floor space in these institutions which will provide for an adequate working space and the efficient placement of equipment.

A study of 126 hospitals, of which 106 were private and 20 were municipal or state, revealed all the variations to be expected from the procedure, frequently allowed, of allotting to the dietary department such space as is not required or suitable for other purposes. However, the private institutions can be grouped according to kitchen floor space, exclusive of storage, *per person served three meals per day* as follows:

	GROUP I	GROUP II	GROUP III
Range in square feet	2–6	6–10	Over 10
Per cent of hospitals	52.8	22.7	24.5
Mode in square feet	4.0	6.0	12.0
Average in square feet	4.2	7.1	14.5

The number of persons served averages 300 in Group I, 200 in Group II, 150 in Group III, and includes staff and employees, as well as patients, but it is interesting to note the arrangement of these institutions according to number of beds.

	GROUP I	GROUP II	GROUP III
1–100 beds	6	4	6
100–200 beds	28	13	15
200–300 beds	13	4	5
Over 300 beds	9	3	0

We see that 52.8 per cent of the private hospitals representative of institutions of every size, fall within the group leaving an average floor allowance, per person served, of 4.2 sq. ft.

Seventy-nine per cent of Group I, 52 per cent of Group II, and 43 per cent of Group III are located in large cities of the east, middle-west, south and west; the remainder are in towns. It is to be expected that smaller space allowances would be found in large communities where space is relatively more valuable.

The type of service also influences floor space. Of 33 hospitals having

central service or a combination central and ward service, 33⅓ per cent fall in Group I and 66⅔ per cent in Groups II and III.

State and municipal institutions show a much smaller range than the private, that is, from 1.6–6 sq. ft. per person served three meals per day. The mode is 3 sq. ft. and the average is 4, approximately that of Group I in the private hospitals. There is similar correlation between city location and smaller floor space.

In an attempt to establish a minimum allowance, the average figure of Group I and of all the public hospitals was chosen as the point for further inquiry from institutions having this amount of space or less. With the exception of two small hospitals, superintendents and dietitians consider approximately 4 sq. ft. per person satisfactory. Without exception all superintendents and dietitians of hospitals with less space, state that it is inadequate.

A similar study of storage space, exclusive of refrigeration, shows an average of 2 sq. ft. per person in private hospitals. Fifty per cent of the municipal institutions have storage space less than this average figure, several institutions running as low as ¼ sq. ft. All of the hospitals having 2 sq. ft. per person find this amount of space adequate, and smaller allowances are invariably considered unsatisfactory.

The average refrigeration space is 2.5 cu. ft. per person in all institutions serving 300 persons or less. Above this the average is 1.8 cu. ft. per person. There are several exceptions of great variation up to 15 cu. ft. per person in small communities in warm climates. Here again the averages proved to be the allowances which are generally acceptable to the dietitians.

These results do not justify conclusions as to optimum floor space, storage, and refrigeration, but they may perhaps be used as suggestive of minimum requirements. Four square feet of kitchen space per person served three meals per day, or approximately 1.3 sq. ft. per meal, is the minimum space considered adequate in the institutions included in this study. This is lower than the allowances for hotels and restaurants of comparable sizes, but the food preparation is without doubt simpler in these hospitals.

The allowance of approximately 7 sq. ft., the average of Group II, or 2.3 sq. ft. per meal, approaches the hotel figure and is perhaps to be advised for hospitals serving less than 150 persons, for hospitals using central service, and for institutions catering largely to private patients and staff in which the complexity of the food service compares favorably with that of hotels.

No figures are available for comparison of storage and refrigeration space, but since transportation facilities are rapidly levelling the advantages due to proximity to markets, the minimum figures which proved to be satisfactory, that is, 2 sq. ft. per person for storage and 1.8–2.5 cu. ft. per person for refrigeration, depending on the size of the hospital, may be useful until further information is at hand.

It is to be hoped that these tentative allowances based on conditions as they exist in certain hospitals will stimulate dietitians actually in charge of kitchen operation to the establishment of standards. Dietitians are in a position to note the fatigue and loss of time which result from work in a kitchen that is too large; on the other hand, in order to discover what will prove the most efficient working unit, they are able to determine the amount of space required for light, well-ventilated food departments, containing the necessary equipment arranged with due regard to the kitchen processes.

HELEN HUBBELL AND MARY DEGARMO BRYAN,
Teachers College, Columbia University.

THE DIABETIC DEATHRATE

The deathrate from diabetes in the first three months of 1929 (23.8 per 100,000) was the highest ever recorded among the industrial policy holders of the Metropolitan Life Insurance Company, according to the *Statistical Bulletin* for May, 1929. This new high level was due, in part, to the wide prevalence of influenza and pneumonia, which hastened the deaths of a number of diabetics. But, apart from such deaths, there has been a large increase in diabetic mortality; during the months of March and April, with the epidemic rapidly waning, the diabetic deathrate exceeded the high figures for those months in 1928.

Despite the fact that the diabetes deathrate did increase in 1927, showed a further rise in 1928, and promises to reach, in 1929, the highest figure ever recorded, it is the definite judgment of the Company's statistician that, but for the increasing use of insulin, the deathrate would be much higher. Insulin has demonstrated its value in prolonging the lives of young diabetics; it has enabled older patients to utilize a diet adequate for the resumption of their former activities. Coma is preventable and curable by insulin; diabetic deaths from infections and surgical operations are reduced, under expert care, by the use of insulin. Yet the death rate among males of between forty-five and sixty-five years shows no important change, and after the age of sixty-five, there has been

a distinct and significant rise. Females show a decline for the periods of childhood and early adult life; from thirty-five to forty-five years, there has been a slight rising tendency; after fifty-five, the rate has risen sharply.

It is the opinion of the Company that "diabetes is on the increase, in spite of the use of insulin, because of the dietary excesses practiced by the American people." Insulin cannot control the incidence. Its use does not always necessarily control the disease. Among 1,044 deaths in 1929, up to April 15, 664 cases, or 63 per cent, had received insulin. A similar survey in 1924–1925, showed that in only 49 per cent of the cases was insulin administered. In 1924–1925, only 7 per cent of the cases had begun insulin treatment a year or more before death, as compared with 30 per cent in 1929. In 1929, 12 per cent had been treated for three years or more before death.

These findings are wholly preliminary. The Metropolitan will continue collecting reports from physicians throughout 1929. Early next year a statement of the facts of insulin treatment, covering the returns for the whole of 1929, will be published. In the writer's opinion, popular education along dietary lines may reduce the incidence of diabetes, especially among older people; once the disease has developed, the careful administration of insulin is valueless without equally careful dietary control. The increasing deathrate since 1924–1925 may indicate the need for a resumption of the earlier enthusiastic and thorough dietary education and skilled care of the patient, so stimulated by the discovery of insulin in 1921.

M. P. H.

CURRENT COMMENT

On to Detroit

Bulletins and news letters already mailed members have given the salient points of the Detroit Convention; it but remains for us to lay added stress on the important features on which your decision to attend may hinge.

Naturally, the program is of first interest. By consulting your last news letter, you will note that it contains the names of men who are at the very top of their profession. The Program Chairman is to be complimented on securing such an aggregation of authoritative speakers. The section meetings, too, look particularly interesting. The trips planned, commercial exhibits, entertainment, teas, and the fascination of the city itself all beckon to you.

It is often said that the benefits derived from a convention do not depend so much upon the program, but upon the conversation and exchange of ideas, the meeting of old acquaintances and the making of new ones. If you are of this opinion, do not miss the Detroit Convention.

Dorothy Knight Hassler,
Publicity Chairman.

One and One-Half Fare—American Dietetic Association Meeting

Remember we want the reduced fare again this year! Do your share to make it possible, and be sure to ask for a Certificate *at the same time* you purchase your railroad ticket for the Convention. The following passenger associations have granted us this privilege: Central Passenger Association territory; Southwestern Passenger Association territory; Trans-Continental Passenger Association territory; Western Passenger Association teritory; Canadian Passenger Association, Eastern Lines, territory; Southeastern Passenger Association territory; Trunk Line Association territory; New England Passenger Association territory; and Canadian Passenger Association, Western Lines, territory.

They agree that "if not less than *150* members of your association are in attendance at the meeting and dependent members of their families holding regularly issued certificates from points from which the Certif-

icate Plan reduction is authorized, showing the purchase of going tickets at regular one-way tariff fare of *67 cents* or more, they will, upon the certificates' being validated by the Special Agent of the carriers, be returned at one-half of the regular one-way fare applying from place of meeting to original starting point and via the same route traveled on the going trip as shown on the certificate."

In other words, we cannot have the benefit of half-fare going home unless at least *150* members or their relatives come to the convention with certificates. The meeting is in Detroit this year, so that members living near Detroit must be very careful to get their individual certificates. If they go back and forth to the meetings each day, they are entitled to get a certificate *each time they come to Detroit.* Of course, they will have to allow extra time to purchase the ticket for it takes time to have the certificate filled out, but a half hour should prove ample. Half of 67 cents is only 34 cents, and to busy dietitians may seem too small a sum to warrant the extra time. *But*—and this is vital—if getting a certificate, when the one-way fare is only 67 cents, assures the Association the minimum of 150 certificates, you are helping those who have to come long distances, to whom every cent saved means being able to come another year instead of having to stay at home.

Last year at Washington, D. C., we secured the necessary 150 certificates for the first time, although only by a narrow margin. Past records show that a large group at the meetings come from the suburbs or near-by towns and because of their failure to secure certificates our members do not get the benefits of half-fare going home.

These are the provisions under which we may secure the Certificate Plan benefits. Please read them carefully—they are easy to follow.

1. All members attending convention are entitled to a certificate.
2. All exhibitors are entitled to a certificate.
3. The minimum number of certificates required is 150.
4. The minimum distance permitting a certificate is that covered by a one-way fare of 67 cents.
5. Certificate *must* be secured at point of departure when purchasing going ticket to convention.
6. At least half an hour must be allowed to purchase ticket and secure certificate; if possible, do this several days ahead instead of waiting until the last minute.
7. Tickets purchased under the Certificate Plan are good for the regular stop-overs granted with non-convention tickets.

8. Certificate should be secured, even if you will not return by the same route. You can afford to help your fellow members save money.

9. Certificates should be turned into the Secretary when you register at Detroit.

10. The certificates must be validated by the Special Agent of the Carriers.

11. They must also be endorsed in ink by the Secretary.

12. Your certificate, properly validated and endorsed, returned to you, assures your receiving one-half fare going home.

Our attendance at past meetings has been well over 500 members, and yet last year was the first time we had 150 certificates; the loyalty of Baltimore members alone made it possible. Bring your Certificate!

QUINDARA OLIVER DODGE,
Secretary.

THE ADMINISTRATION SECTION

The organization of the Administration Section of the Association is being very actively developed by the chairman, Lenna Cooper, and her committee. Membership in the section is available to Association members of recognized training and experience in administrative work on payment of an enrollment fee of one dollar. The payment of two dollars entitles section members to enrollment in the inactive file of the Placement Bureau at the Association's business office.

An important objective of this group is to have available at all times a list of eminently qualified women in administrative fields, as well as to foster and develop adequate training for prospective section members.

A complete bibliography of all the literature of especial interest to administrative dietitians engaged in hospital, institution, restaurant and hotel work is already available to section members. Further information may be obtained from the secretary of the Section, S. Margaret Gillam, University Hospital, Ann Arbor, Michigan.

BOOK REVIEWS

The Treatment of Diabetes Mellitus. Fourth Edition, enlarged, revised and rewritten. Illustrated. By Elliott P. Joslin, M.D. Price $9.00. Philadelphia: Lea and Febiger, 1928, pp. 998.

The Fourth Edition of Joslin's authoritative treatise on diabetes has been written with due consideration of the changed point of view toward the diabetic. The previous edition was written when insulin therapy was in its infancy; with its approaching stabilization and the intelligent application of the advances in physiology, chemistry, and pathology, diabetic cases will seldom be severe or even moderately severe, but will usually be mild. Dr. Joslin has brought information from all these sources to bear upon the problem of treatment. Synthalin, myritillin, the use of liver, the utilization of exercise, the cultivation of morale and advanced ideas upon diet, all receive consideration. The accumulation of clinical facts as well as laboratory data have been presented.

The section on children has grown to fifty pages. Apropos of this, the frontispiece is a photograph of a sturdy girl (age 20, height 175.3 cm., weight 72.7 kilos), a junior in college, who "celebrated her tenth diabetic anniversary in December, 1927"—a worthy tribute to Dr. Joslin's skill with children, before the days of insulin.

Arteriosclerosis, and the methods employed to delay its approach are described in detail, also the best methods for the routine removal of infected foci. More extensive treatment is given of the complications of diabetes, than in previous editions.

Food and the Principles of Dietetics. Sixth Edition. By Robert Hutchinson, M.D. Edin, F.R.C.P. Price $5.00. New York: William Wood and Co., 1927, pp. 610.

This book by a leading British physiologist was first published in 1900 and is familiar to most of the home economics pioneers who flourished during the early days of the twentieth century. The present edition has received some modification of the sections on optimum protein, the vitamins, the principles of infant feeding and the dietary treatment of certain diseases.

What's Best to Eat? By S. Henning Belfrage, M.D. (Lond.), M.R.C.S., L.R.C.P. With a practical supplement by Lucy H. Yates, M.C.A. Price $3.00. New York: William Wood and Co., 1927, pp. 199.

The author hopes that this book "will be helpful, not only to the very large number of people who are intelligently concerned about their food and health, but also to those of his colleagues who have not as yet fully appreciated the importance of the dietary factor in the causation of disease." Dr. Belfrage forcefully points out his conception of the relationship of disease and faulty habits of diet. A practical application of the information incorporated in Part I is suggested in Part II, in which Miss Yates gives methods of food preparation and recipes.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal of Physiology

Vol. 88, May, 1929

The optimal water requirement in renal function. J. L. Gamble, M. C. Putnam and C. F. McKhann.—p. 571.

Vol. 89, June, 1929

*Studies in the physiology of vitamins. C. J. Stucky and W. B. Rose.—p. 1.

The motor and secretory activity of the stomach during acute and chronic obstructive jaundice in dogs. K. S. Still and A. J. Carlson.—p. 34.

*Studies in the nutrition of the white mouse. H. H. Beard and E. Pomerene.—p. 54.

Studies on nerve metabolism. R. W. Gerard and J. Wallen.—p. 108.

Physiological variations in the cardiac output of man. A. Grollman.—p. 157.

Studies in the physiology of vitamins. Changes observed in the blood constituents of dogs, used in the experiments during the progress of vitamin B deficiency, may be largely attributed to starvation incident to the deficiency disease. The lack of vitamin B accentuates the anhydrema which is frequently observed in starvation.

Studies in the nutrition of the white mouse. Evidences from these experiments make definite the conclusion, for sometime questioned, that mice develop rickets and that cures take place much quicker than is the case in rats.

American Journal of Public Health

Vol. 19, May, 1929

*Vitamins as factors in health and in food values. Report of the committee on nutritional problems.—p. 482.

Beverages. Report of the committee.—p. 511.

Vol. 19, June, 1929

*The sanitary control of ice cream. F. W. Fabian.—p. 596.

*Nutritive value of ice cream. L. S. Palmer.—p. 601

Lowell fights undernourishment among its school children. J. J. McNamara.—p. 605.

Vitamins as factors in health and in food values. Both the antineuritic and the antipellagric factors of vitamin B are essential for growth. The heat-stable factor of vitamin B tends to prevent the development of pellagra, although evidence shows that other agents may also be involved. Among these are an infectious agent, kinds and amounts of protein ingested, and some pigmentary substances found in butter fat and carrots. A well balanced diet, with milk, contains the important preventive agents.

The sanitary control of ice cream. Sanitary control of ice cream production by means of pasteurization of the ice cream mixture, periodic inspection of plants and regular analysis of the finished product for bacterial content is essential. The freezing temperature has been proven insufficient to kill bacteria, and countless epidemics have been traced to the sale of infected ice cream.

Nutritive value of ice cream. Experiments on albino rats showed that ice cream is a valuable supplement to a diet low in vitamins, and is itself sufficient to produce normal growth in animals fed only ice cream, although the latter developed more slowly than those on a supplemented diet.

Archives of Pediatrics

Vol. 46, May, 1929

*Should whole wheat products displace the refined products? V. E. Levine.—p. 281.

*A study of the antirachitic value of irradiated powdered whole milk. A. G. De Sanctis, L. O. Ashton and O. L. Stringfield.—p. 297.

Alterations in the mechanics of the gastrointestinal tract as a cause of poor appetite in children. J. H. West.—p. 318.

Vol. 46, June, 1929

Clinical significance of the water of metabolism in children. H. Goldstein.—p. 371.

Should whole wheat products displace refined products? It may be an economic impossibility to supplement the deficiency of refined wheat by the use of fruits, vegetables and dairy products. The use of the whole wheat product tends to enlarge the nutritive value of the diet by increasing the intake of iron, vitamins B and E, and indigestible residue.

A study of the antirachitic value of irradiated whole milk powder. The milk powder must be wholly irradiated to prove its effectiveness in preventing rickets. An experiment in which thirty infants were fed on 100 per cent irradiated whole milk powder showed that 80 per cent were entirely protected from rickets.

Hospital Management

Vol. 27, May, 1929

* Suggestions for varying the menu of hospital personnel. L. G. Graves.—p. 45.

Easter tray typical of opportunity holidays offer dietitians. Sister M. Immaculate.—p. 76.

Vol. 27, June, 1929

Hospital encourages public to visit its food service department. Editorial.—p. 98.

Suggestions for varying the menu of hospital personnel. This article deals with the marketing and preparation of cheaper cuts of meat and fish which have been successfully used by the author. The nutritive value and vitamin content is stressed in relation to the cost of the cheaper cuts of meat. The suggestions are very worthwhile for menu planning.

Journal of American Medical Association

Vol. 92, May 4, 1929

Difficulties in the diagnosis of insulin coma. E. Wiechmann.—p. 1495.

Vol. 92, May 18, 1929

* Obesity: circulatory, roentgen-ray and electrocardiograph investigations. A. M. Master and E. T. Oppenheimer.—p. 1652.

Vol. 92, May 25, 1929

Achylia in pernicious anemia after liver treatment. A. H. Johansen.—p. 1728.

Vitamin E. Editorial.—p. 1765.

Vol. 92, June 1, 1929

* A domestic liver extract for use in pernicious anemia. W. B. Castle and M. A. Bowie.—p. 1830.

Vol. 92, June 8, 1929

Basal metabolism of children of abnormal weight. A. Topper and H. Mulier.—p. 1903.

Vol. 92, June 15. 1929

* Liver extract in the toxemia of pregnancy. A. M. Mendenhall and D. L. Smith. p.—2000.
* Botulism from ingestion of ripe fruit. W. J. Stone.—p. 2019.

Vol. 92, June 22, 1929

* The protein factor in pernicious anemia. Editorial.—p. 2104.

Vol. 92, June 29, 1929

The South Carolina food research commission. W. Westar and R. E. Remington.—p. 2161.

Iodine and goitre. Editorial.—p. 2172.

Obesity: Circulatory, roentgen-ray and electrocardiographic investigations. There exists in the obese person a distinct circulatory embarrassment, as proved by the abnormalities of the blood pressure, pulse rate, roentgenogram and electrocardiogram and by the diminished capacity for work. It is not difficult to understand why the fat person is a poor surgical risk, and why his mortality in pneumonia, nephritis and heart disease is higher than the average. These facts give ample explanation for the distinct improvement commonly observed on weight reductions in patients with vavular disease of the heart, hypertension and coronary artery disease.

A domestic liver extract for use in pernicious anemia. It is possible by a simple method to prepare an active and palatable extract of beef liver for use in the treatment of pernicious anemia. The process is such that it may be carried out by the ambulatory patient in his own home at practically no cost additional to that of the liver used.

Liver extract in the toxemia of pregnancy. In twenty-five cases heparmone was added to

the therapeutic armamentarium. In only one case was there any marked benefit from heparmone. In view of the fact that it failed to stop or prevent convulsions or relieve the general post-eclamptic symptoms, while on the other hand, producing alarming symptoms, the use of heparmone has been discontinued by these experimenters.

Botulism from ingestion of ripe fruit. Death occurred from botulism in a case in which symptoms of poisoning developed about one-half an hour after the ingestion of a ripe persimmon. The early symptoms were nausea and difficulty in swallowing, followed eventually by respiratory paralysis. Necropsy revealed acute parenchymatous changes involving the brain, heart muscle, spleen and kidneys, with marked acute fatty degeneration of heart muscle and liver. Effective treatment should consist of an antitoxin administered at the earliest possible moment after the development of symptoms of poisoning. The fact that the toxin frequently proves fatal before the diagnosis can be made, and also the uncertainty or delay in securing an homologous antitoxin are responsible for the high mortality in botulism.

The protein factor in perniciou anemia. It is believed that liver therapy promotes better nutrition and that an increased deposit of protein may be utilized by the bone marrow in a regenerative function, but is more likely used to supply protein starved tissues throughout the body.

Journal of Home Economics

Vol. 21, May, 1929

* The vitamin A content of avocados. L. S* Weatherby, J. Ellsworth Youtz and R. V. Watson.—p. 360.

Vol. 21, July, 1929

* The vitamin C content of cucumbers and cucumber pickles. B. H. Thurman and H. W. Vahlteich.—p. 510.

Green tea as a source of vitamin C. H. E. Munsell and H. B. Kifer.—p. 514.

The vitamin A content of avocados. The avocado is distinctive among fruit as it is practically the only fruit consumed fresh in which the food supply is stored largely as an oil. The determination of vitamin A were made through feeding experiments by the curative method with albino rats. The experiments were carried on using the Calavo, a high grade avocado which must meet certain high standards of maturity and of oil content; the vitamin A content was shown to be high.

The vitamin C content of cucumbers and cucumber pickle. Fresh cucumbers, fresh cucumber pickles made by cooking sliced fresh cucumbers with vinegar, sugar, salt, and spices, salt stock cucumbers and cucumbers preserved in 15–20 per cent sodium chloride solution were used in an experiment to determine the vitamin C content of cucumbers and cucumber pickles. Guinea pigs fed on a basal diet plus 4 to 14 grams of cucumbers, 6 to 15 grams cucumber pickles, fresh and salt stock, were used in the experiment. At the end of 60 days the animals receiving fresh cucumbers and fresh cucumber pickles showed no signs of scurvy while the others had died before that time. From this experiment it may be said that fresh cucumber pickles have the same antiscorbutic potency as fresh cucumbers.

Journal of Biological Chemistry

Vol. 82, May, 1929

* Growth of rats on fat-free diets. A. J. McAmis, W. E. Anderson and L. B. Mendel.—p. 247.

* Vitamin requirements of nursing young. B. Sure, M. C. Kik, and D. J. Walker.—p. 287.

* The effect of vitamin deficiencies on carbohydrate metabolism. B. Sure and M. E. Smith.—p. 307.

A new deficiency disease produced by the rigid exclusion of fat from the diet. G. O. Burr and M. M. Burn.—p. 345.

* The copper content of plant and animal foods. C. W. Lindow, C. A. Elvehjem and W. H. Peterson.—p. 465.

The copper contents of feedingstuffs. C. A. Elvehjem and E. B. Hart.—p. 473.

Tryptophane and growth. C. P. Berg and W. C. Rose.—p. 479.

The metabolism of sulphur, H. D. Lightbody and H. B. Lewis.—p. 485.

Vol. 82, June, 1929

* Composition of bone. Effect of massive doses of irradiated ergosterol. B. Kramer, M. J. Shear and M. R. McKenzie.—p. 555.

* The effect of drying and of sulphur dioxide upon the antiscorbutic property of fruits. A. F. Morgan and A. Field.—p. 579.
Further progress towards the isolation of the antineuritic vitamin from brewers yeast. A. Seidell.—p. 633.
The metabolism of sulphur. H. D. Lightbody and H. B. Lewis.—p. 663.
Vitamin D and fecal reaction. A. L. Bacharach and H. Jephcott.—p. 751.

Growth of rats on fat free diets. In order to study the composition of body fat yielded by an animal grown under a dietary régime in which there was no ingested fat, a diet of extremely low fat content was fed to albino rats, newly weaned and after a two day starvation period. Comparatively good, though by no means an optimal growth has been recorded from these studies. The best growth, however, was exemplified by those animals which received some small exclusion of fat in their diet. Whether this apparent beneficial effect of a small amount of fat is due to the vitamin A content, or other vitamin content, or to its action as a vehicle for the fat soluble vitamins, or whether fat *per se* is essential to growth was not conclusively demonstrated.

Vitamin requirements of nursing young. The results of this experiment which was carried on at the University of Arkansas, showed anhydremia associated with disturbance in the hematopoietic function of nursing young from a deficiency of the vitamin B complex. A total of one-hundred and twenty-five nursing young were used for the pathological work. Varied stages of avitaminosis were produced by a vitamin B deficiency ration. Pronounced bio-chemical changes were produced in the blood with relatively insignificant accompanying changes in the body weight. The depletion of the vitamin B concentration in the mother's diet produced anhydremia in the young, as was evidenced by hemoglobin determinations, erythrocyte counts, determinations of total blood solids and studies of the refractory index of the blood serum.

Effect of vitamin deficiencies on carbohydrate metabolism. The results of an investigation to study the concentration of blood sugar in nursing young of the albino rat suffering from uncomplicated vitamin B deficiency showed that they develop marked hypoglycemia at a stage of the avitaminosis before loss of body weight has occurred. They also develop anhydremia and marked disturbance in hematopoietic function. In polyneuritic nursing young, vitamin B therapy produces a rapid increase in concentration of blood sugar and a degeneration of blood.

The copper content of plant and animal foods. The copper content of about one-hundred and sixty samples of our common food materials was analyzed and charted in a very convenient form. The copper content of leafy vegetables does not place them in the pre-eminent position they hold with reference to the iron content. No food examined was found to be free of the copper element.

Composition of bone. Effect of massive dose of irradiated ergosterol. This article gives the results of experiments in which massive doses of irradiated ergosterol were fed to young rats. Three groups of rats were used. One group served as a control, one group was fed cod liver oil, and the third group was fed irradiated ergosterol. It was found that the serum calcium of the group fed ergosterol was higher than that of the group fed cod liver oil or of the control group. The bones were also analyzed for inorganic phosphate and carbon dioxide. From this data the ratio of residual calcium to phosphorus was calculated. It was found that the ratios obtained for the bones of the rats which had been fed irradiated ergosterol were the same as those obtained for the bones of the control rats and of rats which had been fed cod liver oil.

The effect of drying and of sulphur dioxide upon the antiscorbutic property of fruits. This article gives the results of experiments on peaches, fresh, sundried, dehydrated and both sulphured and unsulphured, to show the effect on the vitamin C content. It was found that the sulphured peach product retained the full antiscorbutic vitamin content of the fresh fruit, but that the

unsulphured, sundried and dehydrated peaches retained no detectable amount of the property. The sulphured dried peach preparations were found to rank with orange juice, raw tomatoes and other highly potent antiscorbutic foods.

The Journal of Nutrition

Vol. 1, May, 1929

* The heat production of the albino rat. II. Influence of environmental temperature, age and sex; comparison with the basal metabolism of man. F. G. Benedict and G. MacLeod.—p. 376.
* The utilization of fatty oils given parenterally. M. Koehne and L. B. Mendel.—p. 399.
* Calcium and phosphorus metabolism in dairy cows. III. The adequate ration for high-producing cows and the effect of exercise on calcium, phosphorus and nitrogen balances. W. A. Turner and A. M. Hartman.—p. 455.
* The effect of heat on the antineuritic vitamin of milk. A. L. Daniels, M. L. Giddings and D. Jordan.—p. 455.

The heat production of the albino rat. Rats are extremely sensitive to temperature. (1) Seasonal variations—increased metabolism in summer; (2) age variations—increased metabolism with increasing age; (3) sex variations—male rats have a higher metabolism.

The utilization of fatty oils given parenterally. A series of experiments demonstrated that fat given parenterally is too slowly metabolized for purposes of nutrition.

Calcium and phosphorus metabolism in dairy cows. Positive nitrogen balances were changed to negative ones with the addition of exercise. The effect of exercise on the mineral metabolism was insignificant.

Effect of heat on the antineuritic vitamin of milk. Evaporated milk, which during the last few years has been widely advocated for use in infant feeding, shows considerable loss of the antineuritic vitamin.

Modern Hospital

Vol. 32, May, 1929

Citrus fruits and the rôles they play in hospital diets. R. Bowden.—p. 124.
* This cafeteria makes its service to the personnel pay. R. Hinyan.—p. 128.

Vol. 32, June, 1929

* Achieving and maintaining high dietary standards. M. T. MacEachern.—p. 136.
Combination mixing machine designed for hospitals. Editorial.—p. 152.
Doing away with the cold food bugbear. Editorial.—p. 160.

This cafeteria makes its service to the personnel pay. In the cafeteria on the California Lutheran Hospital, feeding 250 employees a day, twenty-five cents a meal is allowed each person. A meal ticket is issued for that amount each month and the amount spent is punched on the card at each meal. If the allowance is exceeded, the employee pays in cash. A wide variety of food is served and with this plan there is more satisfaction among the employees than when they were required to eat the regular hospital menu. The amount received covers the cost of raw food, labor and upkeep.

Achieving and maintaining high dietary service standards. Efficient administration of the general food service, scientific dieting of the patients, and the education of student nurses, student dietitians and medical students in dietetics covers the rôle of the dietitian in hospital service.

Western Hospital and Nurses Review combined with Food Facts

Vol. 13, May, 1929

* Obesity, F. S. Modern.—p. 17.
Arthritis. R. F. Atsatt.—p. 21.
* The cause and treatment of peptic ulcer. P. A. Gray and R. Bowden.—p. 28.

Vol. 13, June, 1929

Bacteria control in the production of certified milk. A. Swain.—p. 27.
* The outpatient clinic dietitian. L. M. Giebelstein.—p. 28.
The contribution of the college or university to the training of the student dietitian. E. Hayward.—p. 48.

Obesity. Conclusions drawn from fifty-one cases of simple obesity without endocrine disturbances show that the younger the individual the greater the average daily weight loss, that the average weekly weight loss diminishes in subsequent weeks of

reducing and that an 800 calorie règime is the most efficient.

The cause and treatment of peptic ulcer. This article explains very simply the management of peptic ulcers in the hospital and at home, giving definite plans for feedings and also general instructions for ulcer management from six months to a year.

The outpatient clinic dietitian. This newest member of the dietitian group must be thoroughly trained in diet therapy and other related subjects. She must know food ratios and be able to adapt diets to many nationalities and home conditions. She must be regarded as a social service person, and she must be a sympathetic and understanding teacher.

NEWS NOTES

The Twelfth Annual Commercial Exhibit promises to be a most interesting one and in order to be certain that you are given a fitting introduction to this phase of the Convention, Monday morning has been set aside for this purpose. This will give you time to see the whole exhibit and between meetings you will have the opportunity to more thoroughly discuss the products with the individual exhibitors.

Various fields of interest to the dietitian are represented, food firms, equipment firms, publishers, food associations and educational associations being included on the list. As you no doubt realize, no firm is allowed to exhibit unless it has been approved by the Executive Committee of the Association. Such approval means that so far as the Association has been able to discover the products exhibited meet a high standard and the business ethics of the firm are satisfactory. The Committee on Exhibits is happy to announce that thirty-two of the booths are occupied by old friends of the Association, twenty-six of whom were with us last year, the other six in previous years. It is also a pleasure to welcome the new firms with whom we hope to have as friendly relations in the future as we have enjoyed with the others in the past.

The cordial interest in the Association as expressed by the firms participating, and their offers of coöperation, have been much appreciated and it is hoped that the dietitians will meet them with the same friendly interest.

Booth 44

American Honey Producers' League, Los Angeles, California.

Booth 2

Battle Creek Food Company, Battle Creek, Michigan.

Booth 13

The Chicago Dietetic Supply House, Chicago, Illinois. The Chicago Dietetic Supply House will have on display foods and equipment adapted particularly to the diabetic and ketogenic diets. A dietitian and a special representative from the firm will be in attendance to give complete information concerning the products.

Booth 18

R. B. Davis Company, Hoboken, New Jersey, Cocomalt will be served and samples dispensed to visiting dietitians and their friends at Booth No. 18. How Cocomalt increases the caloric value of milk, adds protein of a high biological quality, calcium and phosphorous, vitamins A, B (complex) and D, will be told by our representative, Miss Elsie Stark.

Booth 25

Evaporated Milk Association, Chicago, Illinois. Exhibit will be in charge of a representative of the Association who will gladly discuss evaporated milk with all interested persons. A stereopticon with a slide film tells a word-picture story of evaporated milk, its manufacture, uses and nutritive value. Publications will be distributed. Foods prepared with evaporated milk will be served to those visiting the booth.

Booth 35

The J. B. Ford Company, Wyandotte, Michigan. Wyandotte Cleaner and Cleanser, for dishwashing and general sanitary cleaning. Wyandotte Detergent, for cleaning paint, enamel, tile, marble, etc., and for mopping floors. Wyandotte Yellow Hoop, for use in the laundry.

Booth 12

General Foods Corporation, New York City. Exhibit of booklets, charts and post-

ers on food selection and preparation and on health subjects. Also a display of the products of the General Foods Corporation, formerly Postum Company, Inc., including Post Food Products, Swans Down Cake Flour, Baker's Chocolate and Cocoa, Minute Tapioca, Jell-O, D-Zerta, Baker's Coconut, Sanka Coffee and Maxwell House Coffee.

Booths 15, 16, and 17

S. Gumpert Company, Inc., Brooklyn, New York. At the Gumpert exhibit there will be on exhibition Gumpert's Gelatine Desserts, Gumpert's Cream Desserts, Gumpert's Sweet Milk Chocolate, Gumpert's Flavoring Extracts and Gumpert's Spices. Mr. A. G. Kerth will be in charge of the exhibition.

Booth 7

The Horlick's Malted Milk Corporation, Racine, Wisconsin. The Corporation will be among the exhibitors at the meeting of The American Dietetic Association and plans unusual activities in the interests of its products, Horlick's the Original Malted Milk, Horlick's Chocolate Malted Milk, and Horlick's Malted Milk Lunch Tablets, both natural and chocolate flavor. Representatives of the firm will be present to explain the uses of these products.

Booth 26

Hospital Topics and Buyer, Chicago, Illinois, The Friendly Hospital Journal, will have representatives of this publication in attendance and will be glad to meet dietitians.

Booth 6

The International Nickel Company, Inc., New York City, will exhibit a full line of pure nickel cooking utensils together with samples of commercial forms of Monel Metal as used in the construction of foods ervice equipment. Literature of special interest to dietitians will be distributed.

Booth 20

Institute of American Meat Packers, Chicago, Illinois.

Booth 9

Johnson-Appleby Company, Cambridge, Massachusetts. Buyers and servers of pure table delicacies can spend a few profitable minutes at Booth No. 9 where the products of the Johnson-Appleby Company of Cambridge, Massachusetts, are on display. These delicious Preserves, Jellies, Marmalades, Relishes, Canned Fruits and Vegetables are packed especially for the hospitai and school trade and are famous for their high quality and purity.

Booth 42

The Journal of The American Dietetic Association, Chicago, Illinois, the official organ of the national association. This publication contains articles by authorities in the various phases of dietetic work which are of interest to dietitians and members of the allied professions. Special rates will be offered during the Convention.

Booth 38

Journal of Home Economics, Baltimore, Maryland, the professional magazine of the American Home Economics Association, publishes authoritative articles on food and nutrition, institutional management, and other subjects of interest to the dietitian or the institutional executive. Our contributors are recognized authorities who give you the benefit of their experience and the results of their research. If you are not familiar with this publication visit our booth and get a sample copy.

Booth 22

The Junket Folks, Little Falls, New York. Have you obtained a copy of the new and interesting booklet, "Junket in Dietetics"? You may, at Booth No. 22. There you may also learn how Junket makes milk into delicious desserts which are health-building and tempting to both sick and well.

Booth 27

The Kellogg Company, Battle Creek, Michigan, will have an exhibit of Kaffee Hag Coffee and the Kellogg Cereals at Booth No. 27. Kaffee Hag is a blend of high grade coffees which through a special process is made caffeine free. Dietitians who visit the

booth will have an opportunity to taste this coffee and receive information concerning its use in special diets.

Booth 37

Libby, McNeill & Libby, Chicago, Illinois. The display at the Convention exhibits leaders from a line of over 100 canned foods, each of them of characteristically uniform quality and goodness. These foods, of finest flavor, are packed in regular and special sizes, particularly for the use of hospital and related institutions.

Booth 43

J. B. Lippincott Company, Philadelphia, Pennsylvania, will exhibit, among other books, the immediately successful, "Nutrition in Health and Disease," by Lenna F. Cooper, Dietitian-Buyer, Detroit, Michigan, Edith M. Barber, Writer and Consultant of Food and Nutrition, and Helen S. Mitchell, Professor of Nutrition, Battle Creek College. Three parts of this book cover the principles of Nutrition and Cookery and one part covers Diet in Disease.

Booth 21

McCormick & Co., Baltimore, Maryland. Bee Brand Spices, Extracts, and Mustards and Banquet Teas. Interesting exhibit showing sources, processes of manufacture and cookery uses of spices, extracts and teas will be featured. Please stop and get acquainted. Also put your name on mailing list for our educational service, free to dietitians.

Booth 45

The Macmillan Company, New York City. In the Macmillan book exhibit appear several new titles and others which are known through the field of nutrition. Among the new books you will find the revised, fourth edition of McCollum and Simmonds' "The Newer Knowledge of Nutrition." Of outstanding interest as well is the new third edition of Rose's "Feeding the Family," and a number of other books on foods and household chemistry.

Booth 1

Mellin's Food Company, Boston, Massachusetts. The exhibit has been planned with the purpose of giving dietitians an opportunity to acquire full and complete information relative to the source, nature and amount of food elements present in Mellin's Food, and to discuss the many conditions where Mellin's Food may be used to the advantage of the patient and satisfaction of the dietitian.

Booth 14

National Child Welfare Ass'n, Inc., New York City. An exhibit of posters which deal with health and dietetics. Will be of interest to dietitians and members of allied professions. These silent teachers present accurate information about foods and health, in attractive picture form. Orders will be taken for future delivery.

Booth 8

National Dairy Council, Chicago, Illinois. An exhibit showing the importance of protective foods in the diet and the way in which they may be easily incorporated.

Booths 4 and 5

E. L. Patch Company, Boston, Massachusetts. The Patch Company representatives will be happy to give you information regarding their important product, Patch's Flavored Cod Liver Oil. So much has been said recently regarding cod liver oil as a source of vitamins A and D that you will not want to miss this opportunity to obtain the latest information along this line and to learn about the manufacture and testing of cod liver oil.

Booth 47

Pattee's Practical Dietetics, Mount Vernon, New York. Miss Pattee has recently issued the 17th edition of her book, which has been rewritten and reset. This comprehensive treatise embraces both the principles of nutrition and the practical side of dietetics, besides the most modern diet therapy. It covers the newest phases of teaching dietetics and will be found invaluable as a text for the student and a reference for the professional nurse.

Booth 23

Royal Baking Powder Company, New York City. Royal, the cream of tartar baking powder, needs no recommendation to doctors and dietitians, it has served them well for many years, in their hospital diet kitchens. At the booth will be displayed that excellent manual "Any One Can Bake," written for students and dietitians by food experts. This book should be on the desk of everyone who must plan for individual and institutional diets.

Booth 41

W. B. Saunders Company, Philadelphia, Pennsylvania, will have an attractive exhibit of their books on subjects that appeal particularly to those interested in dietetics. Included in the titles shown will be McLester's work on Diet and Nutrition; the sixth edition of Friedenwald and Rurah's work on diet; the new edition of Lusk's Science of Nutrition; Wood and Week's Dietetics; Wheeler and Wheeler's Dietotherapy.

Booth 31

John Sexton and Company, Chicago, Illinois.

Booth 34

E. R. Squibb & Sons, New York City, will exhibit a full line of Biological, Pharmaceutical and Household Products. Products of particular interest to dietitians are Vitavose, Dextro-Vitavose, Cod-Liver Oil, Viosterol Cod-Liver Oil-5-D, and Viosterol Squibb. Vitavose and Dextro-Vitavose are being used more and more widely in the modification of cow's milk in infant feeding and in the diets of invalids, convalescents, and expectant and nursing mothers.

Booth 33

Super Maid Cook-Ware, Chicago, Illinois. How to obtain perfect food, with less labor, at less cost, has long been a problem to the housewife. Super Maid Cook-Ware, which was especially designed for this purpose, has proved to be the solution. With it all fresh vegetables, fruits and meat may be cooked without water, without watching or stirring, and with a minimum amount of fuel.

Booth 3

Swartzbaugh Manufacturing Company, Toledo, Ohio. A five year guarantee against burn-out with Food Conveyors of their manufacture is given by The Swartzbaugh Manufacturing Company, makers of the "Ideal" line. They point out that much trouble, time, and expense are saved if hospitals will insist upon a guarantee of this sort before ordering any electrically heated conveyor equipment.

Booth 30

S. C. Teichs Company, Chicago, Illinois.

Booth 36

United Fruit Company, Boston, Massachusetts, will exhibit bananas showing fruit in progressive stages of ripeness, literature regarding food value of the banana, reprints of articles showing value of banana and milk diet for classes of underweight children; dietitians may register for literature and educational material regarding this important food-fruit.

Booth 32

The Welch Grape Juice Company. 1929 is a red letter year, the 12th Annual Exhibit of The American Dietetic Association, and the 60th Anniversary of The Welch Grape Juice Company. Booth 32 is grape juice headquarters, a visit will prove healthfully refreshing, so here's to your health!

British Columbia Dietetic Association. At the annual meeting the following officers were elected: President, Ethel C. Pipes, dietitian in charge, Vancouver General Hospital; Vice-President, H. King, Royal Columbia Hospital; Secretary-Treasurer, E. Warner, Nutritional Department, Fraser Valley Dairy. Miss Pipes and Miss Warner were reelected, showing how much the association appreciated their efficient work. Those appointed on special committees were: H. Aylsworth, E. Saunders and P. Lee.

A review of twelve successful and well attended meetings, and of the work done by the association, was given by the president, Miss Pipes. Several were dinner meetings at which eminent men and women of various

professions were speakers. During the past year deserving persons on special diabetic diets have been supplied with expensive necessities such as cream and bacon. Patients were also supplied with insulin.

Cincinnati Dietetic Association. On May 6th the Cincinnati Dietetic Association held their annual election. The officers elected to serve during the ensuing year were: President, Ruth Sentiff, Bethesda Hospital; Vice President, Jessie Ledgerwood, Christ Hospital; Secretary & Treasurer, Elizabeth Scholnech, St. Mary's Hospital.

Mrs. Renike, Mrs. Ilversocker, Miss Thornton, Miss Gormley and Miss Van Meter attended the annual meeting of the Ohio Dietetic Association held in Columbus, May 14–15th. They represented the Cincinnati Association at a meeting to discuss plans for affiliation with the National Association.

In May the dietitians were invited to hear Dr. James S. McLester, Professor of Medicine, University of Alabama, Birmingham, Alabama, who spoke at the Academy of Medicine on "Common Sense in the Diet."

The June meeting, the last until September, was a dinner meeting held at the Y. W. C. A. new residence. Grace Wolkup was the hostess and after a delightful dinner we were given an opportunity to see the building.

District of Columbia Dietetic Association. At the business meeting officers were elected as follows: President, Grace Bulman, United States Veterans' Bureau; Vice-President, Elsie Fitzgerald; Treasurer, Mildred Parker; Secretary, Lurena Perrine.

Regular monthly meetings have been held and a final formal banquet at Grace Dodge Hotel, with the following speakers: Mary A. Lindsley, Manager of Grace Dodge Hotel, and Lillian B. Storm, President Washington Home Economics Association. Guests were also invited from the nutrition section and section for women in business of the Washington Home Economics Association, also the Richmond, Virginia, and Baltimore, Maryland, dietetic associations.

The next meeting will be in September and will be a demonstration at the National Canners Association. Ruth Atwater, who is with the Canners Association, is a member of the district association and has kindly invited the members.

Massachusetts Dietetic Association. At the annual meeting held in May, the following officers were elected for the year 1929–30: President, Margaret McGovern, Boston City Hospital; Vice-President, Betty Hammett, Varsity Club; Harvard University; Treasurer, M. Louise Elliot, Neighborhood Kitchen; Recording Secretary, Blanche Collier, O. P. D. Food Clinic, Massachusetts General Hospital; Corresponding Secretary, Edith Hoadley, Salem Hospital, Salem; Parliamentarian, Hilda French, N. E. Deaconess Hospital.

Marion Floyd has been appointed chief dietitian at the Massachusetts General Hospital to succeed Rosina Vance who resigned in May. Miss Vance is at her home in Winston-Salem, North Carolina at present. Other recent appointments at the Massachusetts General Hospital are Helen Hance, administrative assistant, and Dorothy Prentiss, therapeutic assistant. Both Miss Hance and Miss Prentiss are Walter Reed Hospital graduates.

Evelyn Pearson, Dietitian at Bradford Academy, Bradford, is spending the summer in Europe.

Cards have been received announcing the marriage of Miss Thelma Price, Milk Laboratory dietitian at the Boston City Hospital to Samuel Camber, on Saturday, July 13, 1929.

Eva Hunt, formerly of the Beth Israel Hospital, Boston, has accepted the position as dietitian at Westerly Hospital, Westerly, Rhode Island.

Ellen Riley, formerly dietitian at the White House, is at Longwood Towers, Brookline.

Martha Boitch, until recently of the Massachusetts General Hospital, has accepted a position as dietitian at City Hospital, Winston-Salem, North Carolina.

Gertrude Spitz has started a new food clinic at the Out-Patient Department of the Beth Israel Hospital.

Frances Stern of the Boston Dispensary

Food Clinic, has been in Germany for the past few months.

The Minnesota Association of Hospital Dietitians. May O'Toole was transferred from Mount Alto, Washington D. C. to U. S. Veterans' Hospital No. 106, Fort Snelling.

Mildred Hagstrom, a graduate of the University of Minnesota, is now assistant dietian at the Northern Pacific Hospital, St. Paul. Miss Hagstrom had her student dietetics course at the University Hospital, Minneapolis.

Grace Rutherford, a graduate of the University of Minnesota, is now assistant dietitian at the Midway Hospital, St. Paul. Miss Rutherford had her student work at the New Asbury Hospital, Minneapolis.

May I. Hoiliem, a graduate of State Teachers' College, Aberdeen, S. D., is now dietitian at the St. Paul Hospital, St. Paul. Miss Hoiliem had her student work at the University Hospital, Minneapolis.

Betty Irwin is now assistant dietitian at St. Luke's Hospital, St. Paul. Miss Irwin completed her student work at the Ancker Hospital, St. Paul.

Blanche Kearney has resigned her position at St. Mary's Hospital, Minneapolis. Miss Kearney has accepted a position at St. Joseph's Hospital, Baltimore, Md.. Blanche Yelland is now the dietitian at St. Mary's Hospital.

Helen Kuntz of the Northwestern Hospital, Minneapolis, is enjoying a two month's vacation. Miss Kuntz is taking an extended trip through the West and the Hawaiian Islands.

The May meeting was held at the University Farm Campus, St. Paul. Wylle B. McNeal, Chief of the Division of Home Economics, University of Minnesota, talked on "The Curriculum for Dietitians." Alice Biester, Chief of the Nutrition Section, talked on "Newer Aspects of Nutrition." After the program the annual election of officers was held and the following officers elected for the coming year: President, Harriet Warmington, U. S. Veterans' Hospital, Fort Snelling; Vice-President, Florence Sperry, dietitian at Witt's Market House, Minneapolis; Recording Secretary, Margaret Patterson, St. Andrews Hospital, Minneapolis; Corresponding Secretary, Dixie Rudberg, Ancker Hospital, St. Paul; Treasurer, Mildred Thom, U. S. Veterans' Hospital, Fort Snelling.

The June meeting was held at Birchwood, White Bear Lake. A business meeting, with annual report by the chairmen of the various committees, was followed by a picnic supper and social.

The New York Association of Dietitians held the last meeting of the season at Russell Sage Foundation. The first speaker was Dr. Ruth Wheeler of Vassar College. Her topic was "Diet and Teeth," and she spoke of the various types of research being done in this field. Dr. Wheeler also mentioned the present research work on underweight and overweight, and the relation of these conditions to health. Dr. Ladd of Presbyterian Hospital discussed the present tendency in prescribing diabetic diets, and gave his own methods. He brought out the interesting point that insulin, so far as we now know, may deal with fat metabolism rather than (or as well as) with carbohydrate metabolism.

The St. Louis Dietetic Association held its annual picnic June 17th, on the roof of the new Barnes Hospital Nurses home. Meetings will be suspended until September 16th.

Eugenia Martin, chief dietitian of Barnes Hospital, Ruth Kahn, dietitian in charge of Barnes Hospital Metabolic Ward, Florence Haach, teacher of home economics at the University City High School, and Merle Williams, consulting dietitian, attended the Columbia University summer session. Miss Williams has accepted the position of assistant in the Barnes Hospital dietary department. She will have charge of the teaching of student nurses.

Lucille Paddleford has resigned her position as assistant in the Jewish Hospital dietary department. Miss Paddleford will be at her home in Miller, South Dakota.

Emma Millard, head dietitian at St. Luke's

Hospital, attended the American Hospital Convention in Atlantic City in June.

Helen Baschnagle has resigned from Mullanphy Hospital and is at her home in Iowa City, Iowa.

Dr. and Mrs. Glover Copher announce the arrival of a daughter, July 23rd. Mrs. Copher was formerly Marjorie Hulsizer; she has been prominent in Association work and is at present a member of the Journal Board.

Virginia Dietetic Association. Mary Curfman, dietitian at the Johnson-Willis Hospital, Richmond, resigned on July 15th and returned to her home in Maryville, Missouri, for a vacation. She has not yet accepted a position.

Jennie M. Ballard, assistant administrative dietitian of the Medical College of Virginia, Hospital Division, Richmond, resigned July first, accepting a position as staff dietitian with the U. S. Veterans' Hospital, Northport, Long Island, N. Y. Mrs. Ruth C. Kyle of Richmond is relieving in Miss Ballard's position until a new dietitian can be secured for the position.

Ima F. Scott, chief dietitian of the Medical College of Virginia, Hospital Division, Richmond, resigned on July 15th, resignation to become effective on August first. Miss Scott will spend the month of August with her parents in Tennessee.

Celeste Whiteside, chief dietian, Retreat for Sick Hospital, Richmond, is to be married in September. Lois Watts, assistant dietitian to Miss Whiteside, resgiend on July first.

Gertrude Brown, chief dietitian at St. Luke's Hospital and president of the local organization, will take her vacation during the month of August. Genevieve Bell, Miss Brown's assistant at St. Luke's Hospital, is on her vacation in Westfield, New York.

Dietetics in Porto Rico. Mrs. Rita R. Lang, School of Tropical Medicine, San Juan, Porto Rico, writes to the *Journal* editor that "Up to now, we are only five dietitians with the B. S. degree, and three with the third year diploma in Home Economics. We are planning to meet as soon as possible and form our own local association, following your valuable suggestion. We are all very much interested in starting it.

During these months, I am busy equipping three of the Government Hospitals in San Juan, Porto Rico, but as soon as I will get through this work I will begin to write about the development of the Dietetics Department in Porto Rico. I will try my best to be present at this year's convention in Detroit."

Oslo, Norway. Gudrun Carlson, United States Trade Commissioner, writes "Since arriving in Oslo I have met several home economists, doctors, dentists, nurses and others allied with the question of food and diet. Home economics at the principal training school at Stabekk is very practical and thorough, but aside from cookery and some hygiene and physiology, dietetics is scarcely touched upon. The hospitals have no trained dietitians, the doctors and nurses taking responsibility for special diet work. Although Oslo can boast of one of the finest hospitals in Europe, its dietary work, either for staff or patients, is not developed to the point known in our country. Naturally some attempts are being made to meet nutritional and dietary demands. Foremost among these may be mentioned the diet kitchen established by the Nurses' Association, headed by Miss Bergliot Larsen. Rooms in an old building conveniently situated near the center of the city have been remodeled to use for the headquarters of the association, for offices, kitchen and dining rooms. Here patients may come and be served whatever foods the doctors have prescribed. Attractive, inexpensive meals based on good nutritional principles are served also for those who wish to buy meals there even if not on a strict dietary regime. This helps finance the enterprise.

Miss Bergliot Larsen who directs the diet kitchen is now planning a trip to the United States. I would like to have her get acquainted with a few of our leading dietitians in the United States and to see some of the

work in our best hospitals and institutions and food clinics."

The Mary Immaculate Hospital in Jamaica, N. Y. was formally opened June 14th. It is one of the most complete hospitals in the country, with a bed capacity of 325. The kitchens are equipped for central service.

Helen L. Brown, formerly the head dietitian at the New England Hospital for Women and Children of Boston, has been appointed administrative dietitian. Florence E. Ripp will continue her work in charge of the special diet kitchen and as dietetic instructor. Mrs. Agnes O'Dea of the Hotel Empire, New York City, equipped and organized the hospital.

NEW MEMBERS

(August, 1928–July, 1929)

Ackley, Margaret.....Santa Clara Hospital, San Jose, Calif.
Aldwell, Doreen.....Seattle General Hospital, Seattle, Wash.
*Alexander, Mary.....Lockport, Illinois
Allbritton, Mildred.....Walter Reed Gen. Hospital, Washington, D. C.
*Almy, Constance.....Ohio Valley Gen. Hospital, Wheeling, W. Va.
Altman, Bess.....Altoona, Iowa
Anderson, Helen.....Walter Reed Gen. Hospital, Washington, D. C.
Austin, Moselle.....Shell, Wyoming
Auman, Margaret.....1220 Fairfield Avenue, Fort Wayne, Indiana
*Axtell, Eunice.....Connellsville St. Hospital, Connellsville, Pa.
†Bailey, Pauline.....Bronson Methodist Hospital, Kalamazoo, Mich.
†Baldwin, Helen.....Borden Co., 350 Madison Ave., New York, N. Y.
Bartelme, Jean Mrs.....4656 Knox Ave., Chicago, Illinois
*Beattie, Alice.....Presbyterian Hospital, New York, N. Y.
*Beatty, Alice.....University Hospital, Augusta, Ga.
Beadreau, Joseph Mrs.....Providence Hospital, Seattle, Wash.
†Berring, Alma.....Sheppard and Enoch Pratt Hosp., Towson, Md.
†Bicknell, Margaret.....Gallinger Municipal Hospital, Washington, D. C.
†Bigelow, Natalie.....343 State St., Rochester, N. Y.
Binns, Gertrude.....224 Alexander St., Rochester, N. Y.
Birchard, Margaret.....Ft. Hamilton Hospital, Hamilton, Ohio
Blair, Eulalia Mrs.....1440 Cavalry Ave., Detroit, Michigan
†Bogie, Mary M.....Michael Reese Hospital, Chicago, Ill.
*Bonen, Bernardine.....St. Francis Hospital, Evanston, Ill.
Brack, Alice.....Elyria Memorial Hosp., Elyria, Ohio
Braden, Ruth.....Rockville, Maryland
Branch, Esther.....2802 S. Kilbourne Ave., Chicago, Ill.
*Brown, Mauddell.....Nashville, Indiana
*Bryant, Elizabeth.....Peter Bent Brigham Hospital, Boston, Mass.
†Buck, Doris.....Williamsport Hospital, Williamsport, Pa.
Burns, Helen.....Walter Reed Gen. Hospital, Washington, D. C.
Burns, Kathleen.....509 S. Honore St., Chicago, Ill.
Burr, Marjorie.....818 Harrison Ave., Boston, Mass.
Burton, Fern.....Oteen, N. C.
Butler, Ruth.....Chesapeake & Ohio Hosp., Clifton Forge, Va.
Cabanillas, Berta.....Carlota Matienzo Hall, University of Porto Rico, Rio Piedras, P. R.
*Calkins, Evelyn.....Pulaski, N. Y.
*Carmody, Helen.....Mount Hope, Wisconsin
*Cartmill, Genevieve.....University Hospital, Ann Arbor, Mich.
*Chapman, Ruth.....1077 23rd St., Des Moines, Iowa
Clark, Grace.....Pontiac State Hospital, Pontiac, Michigan
*Coffman, Carolyn.....821 Salem Ave., Dayton, Ohio

Cole, Jessie.....New York State Dept. of Health, Albany, N. Y.
*Conaton, Edith.....16112 Clifton Blvd., Lakewood, Ohio
*Connors, Elizabeth.....Pondville Hospital, Wrentham, Mass.
*Conothers, Lillie.....Evanston Hospital, Evanston, Ill.
*Cook, Carrie.....McClave, Colorado
*Cook, Helen.....555 Taylor St., San Francisco, Calif.
Covey, Grace.....Mercer University, Macon, Ga.
Cox, Dorotha.....125 De Sota St., Pittsburgh, Pa.
†Cronk, Elva.....Jackson Memorial Hospital, Miami, Fla.
*Cross, Winifred.....City Hospital, Akron, Ohio
Cruise, Margaret.....Stout Institute, Menomonie, Wis.
Crumb, Owena.....Niagara Falls Mem. Hospital, Niagara Falls, N. Y.
Curran, Kathryn.....Boston City Hospital, Boston, Mass.
*Curtis, Louise.....Waymart, Wayne Co., Pa.
*Dahlen, Myrtle.....Springfield Hospital, Springfield, Ill.
Dames, Minnie.....Freedmen's Hospital, Washington, D. C.
*Danahay, Julia.....St. Mary's Hospital, Rochester, Minn.
*Darby, Ruth.....Baltimore City Hospital, Baltimore, Md.
*Dautrich, Gertrude.....Bridgeport Hospital, Bridgeport, Conn.
Dautrich, Helen.....Walter Reed Gen. Hospital, Washington, D. C.
Day, Daisy.....1819 W. Polk St., Chicago, Ill.
†Day, Sister Theodora.....Seton High School, Baltimore, Md.
†Dickinson, Dorothy.....Oklahoma Baptist Hosp., Muskogee, Okl.
*Diton, Marie Mrs.....139 Parsons St., Detroit, Mich.
†Doran, Kathleen.....St. Mary's Hospital, Green Bay, Wis.
*Dortch, Martha.....Massachusetts Gen. Hospital, Boston, Mass.
Douglas, E. Constance.....Palo Alto Hospital, Palo Alto, Calif.
*Douglas, Madalene.....2825 S. Hope St., Los Angeles, Calif.
†Downey, Letitia.....Charlotte Hungerford Hosp., Tarrington, Conn.
Drummond, Laura.....Temple University, Philadelphia, Pa.
Dunham, Helen.....1905 E. 90th St., Cleveland, Ohio
†Durren, Helen.....86 E. Van Buren St., Battle Creek, Mich.
†Ebbett, Deborah.....Winchester Hospital, Winchester, Mass.
*Edgington, Ruby.....Ft. Hamilton Hosp., Hamilton, Ohio
Edson, Emily.....St. Joseph's Hospital, Bellingham, Wash.
*Eipe, Checka.....St. Christopher's Training College, Kilpauk, Madras, S. India.
*English, Bess.....340 Hallister Ave., S.E., Grand Rapids, Mich.
Enright, Eleanor.....Washington Dairy Council, Washington, D. C.
*Erni, Esther.....Cincinnati General Hospital, Cincinnati, Ohio
*Evans, Clara.....Long Beach Community Hosp., Long Beach, Calif.
*Ewertz, Elsie.....St. Mary's Hospital, Rochester, Minn.
*Fariss, Eunice.....413 Main St., Lee's Summit, Missouri
*Firmbach, Dorothe.....3638 Humphrey St., St. Louis, Missouri
*Fischbach, Madeleine.....Mellen, Wisconsin
Fix, Aletha.....Woodland Clinic Hosp., Woodland, Calif.
Fling, Leila.....N. J. State Hospital, Greystone Park, N. J.
*Floyd, Annie.....600 N. Broadway, Baltimore, Md.
*Foley, Margaret.....St. Luke's Hospital, Kansas City, Missouri
*Forck, Anna.....Garfield Memorial Hospital, Washington, D. C.
Fowler, Delta.....Peralta Hospital, Oakland, Calif.

Fox, Eva.....Veterans' Hospital, Legion, Texas
*Freeman, Kathryne.....Deaconess Hospital, Cincinnati, Ohio
*Fresk, Evelyn.....Pottsville Hospital, Pottsville, Pa.
Frith, Marjorie.....Michael Reese Hospital, Chicago, Illinois
Fullreide, Hazel.....University Hospitals, Minneapolis, Minn.
Gallagher, Gertrude.....St. Vincent's Hospital, Indianapolis, Ind.
*Garrett, Marion.....Grant Hospital, Chicago, Illinois
*Gear, Wilma.....Hospital for Sick Children, Toronto, Ont., Can.
Gettel, Mable.....Roanoke Rapids Hospital, Roanoke Rapids, N. C.
Gilchrist, Margaret.....Temple University, Philadelphia, Pa.
Goldsmith, Madeleine.....353 W. 85th St., New York, N. Y.
Gormley, Margaret.....General Hospital, Cincinnati, Ohio
*Gramling, Ruby.....Presbyterian Hospital, Pittsburgh, Pa.
Greig, Erma Mrs.....West Side Hosp., Chicago, Illinois
*Griess, Gertrude.....St. Louis Mullanphy Hospital, St. Louis, Mo.
Haas, Marjory.....Mater Misericordiae Hosp., Sacramento, Calif.
Halstead, Mildred.....Misericordia Hospital, New York, N. Y.
Harbage, Minerva.....Robert Packer Hospital, Sayer, Pa.
Harden, Ida.....Hahnemann Hospital, Philadelphia, Pa.
Hatvedt, Hannah.....Memorial Hospital, Cheyenne, Wyoming
Hauck, Hazel.....12 E. Gilman St., Madison, Wis.
Hawkins, Esther.....Safford, Arizona
*Hawver, Helen.....2000 Foster Ave., Chicago, Ill.
Heald, Dorothy.....Miami Valley Hospital, Dayton, Ohio
*Heard, Helen.....3020 Colfax Ave., S., Minneapolis, Minn.
†Hellberg, Hildur.....Lutheran Memorial Hospital, Chicago, Ill.
Hendrick, Bertha.....Kellogg Hall, Battle Creek, Michigan
Hill, Kathryn Mrs.....Box 27, Hamlet, Indiana
*Hills, Gladys.....Holyoke Hospital, Holyoke, Mass.
*Hinman, Marion.....Philadelphia General Hospital, Philadelphia, Pa.
Hirleman, Neva.....Holzer Hospital, Gallipolis, Ohio
*Hoffman, Nadine.....University Hospital, Columbus, Ohio
*Hoke, Bernice.....R. #1, Manhattan, Kansas
Hollett, Emma.....Children's Hospital, Denver, Colorado
Hood, Jean.....Wisconsin General Hospital, Madison, Wis.
Hornsby, Ruth.....Memorial Hospital, Owosso, Michigan
*Houston, Anna.....Burlington Junction, Missouri
Howe, Eleanor.....McCormick & Company, Baltimore, Md.
Howley, Mary Sister.....Marywood College, Scranton, Pa.
*Hug, Irma.....Milwaukee Children's Hospital, Milwaukee, Wis.
Humphrey, Carolyn.....Nichols Hospital, Battle Creek, Mich.
*Idle, Christmas Mrs.....643 Chautauqua St., Norman, Oklahoma
*Irwin, Betty.....St. Luke's Hospital, St. Paul, Minn.
†Jacobson, Harriet.....c/o Dr. Jacobson, Chicago Laboratory, 25 E. Washington St., Chicago, Ill.
James, Elva.....600 N. Broadway, Baltimore, Md.
James, Mary Mrs.....Miami Valley Hospital, Dayton, Ohio
Janssen, Marjorie.....1322 N. Vermont, Los Angeles, Calif.
*Jones, Floy.....Texarkana Hospital, Texarkana, Texas
*Jones, Ruth P.....Women's Southern Homeopathic Hosp., Philadelphia, Pa.

*Jones, Zell	Halstead Hospital, Halstead, Kansas
*Jorden, Ann	347 Sandusky St., Jacksonville, Ill.
*Kazmann, Fannie	4019 Clarendon Ave., c/o Miss Martignoni, Chicago, Ill.
Keeney, Dana	Essex County Hospital, Cedar Grove, N. J.
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